

The Iron Age

A Review of the Hardware and Metal Trades.

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The Oliver Chilled Plows.

We present herewith an illustration of the Oliver chilled plow, which has certain points of merit which deserve brief mention. As indicated by the name, the scouring parts of this implement are made of chilled iron. The temper imparted by the chilling process insures uniformity, durability, hardness and smoothness—which give it excellent scouring qualities in all kinds of soil. The manufacture of chilled iron plows has been several times tried and abandoned as impracticable, but by a process invented by Mr. James Oliver, the mechanical difficulties have been overcome. Unlike cast iron or steel, chilled iron does not readily oxidize, and will bear months of exposure to dampness without forming more than a thin rust, which is entirely removed by running the plow a few feet through the soil, leaving the surface bright. The metal is so hard, indeed, that a plow which has been used in soil containing sharp gravel can be used in prairie land without danger of sticking. This cannot be done with some of the cast steel plows, we are informed, as the gravel scratches and roughens the surface of the mold board to such an extent that, when subsequently used in soft, sticky soil, they cannot be made to scour. In addition to excellence of material, the manufacturers claim exceptional excellence of design and workmanship. They are perfectly adjustable in every way. The width and depth of the furrow, the roll, or inclination to drag on either handle, and the change from two to three horse adjustment, are all under control of the plowman, and can be effected by the turning of a nut. This is a valuable improvement upon the usual method of making plows rigid and unchangeable. The "jointer," which is shown in our illustration attached to the beam forward of the standard, is another of the peculiar features of the plow. By using this attachment all vegetation is skimmed from the surface of the ground, thrown to the bottom of the furrow previously turned, and buried so deeply that it is not likely to reappear. After plowing, not a spear of grass or stalk of weed can be seen, and the surface is so smooth that only one harrowing is needed.

The wheel, also shown, is so constructed as to permit of easy adjustment. As the depth of the furrows and direction of the draft are controlled by a turn of a wrench, the wheel is not indispensable to the successful running of the plow; but it is recommended for general use for reasons which need not here be set forth. As will be seen from an examination of our illustration, the point, or share, forms a continuation of the mold board, extended forward, thereby securing solidity and avoiding the space which is usually formed between the cutting points and mold boards of plows. By this arrangement the soil is made to press on and pass over every inch of metal below the ground surface, insuring the perfect scouring of all parts. By reason of this construction the draft of the plow is greatly reduced. We are informed by the manufacturers that, from thorough tests made during the current year, the reduction in draft may be estimated at fully 25 per cent. under the average of plows in common use. The shares for these plows are made in such variety as to meet the requirements of any kind of soil, from the hardest clay to soft marsh land. Molds are also made in two styles, for light and heavy soil, and all parts are interchangeable, according to the size and number of the plow. These plows are manufactured at the South Bend (Indiana) Iron Works, and are the exclusive product of this establishment, which continuously employs 200 skilled artisans in the several departments of the business. The company have lately purchased a tract of 30 acres, favorably located at South Bend, upon which larger and more commodious works are to be erected.

British Exhibits of Iron and Steel at the Vienna Exhibition.

The Royal Official Reports have just been issued, and the following remarks are taken therefrom relative to the exhibits of iron and steel. On "Mining Produce" the officials say:

"It is a very remarkable fact that it was precisely those countries which are rich in mineral produce of the most varied kind which were not well represented in the Exhibition, as from that circumstance they might have been, and were indeed expected to be; and this remark has reference more particularly to the United Kingdom of Great Britain, which sent but a scanty selection of her mineral produce to the Exhibition."

In treating of "Iron Smelting," Franz Kupferwieser, Professor of the Science of Assaying and Smelting at the Mining Academy at Leoben says:

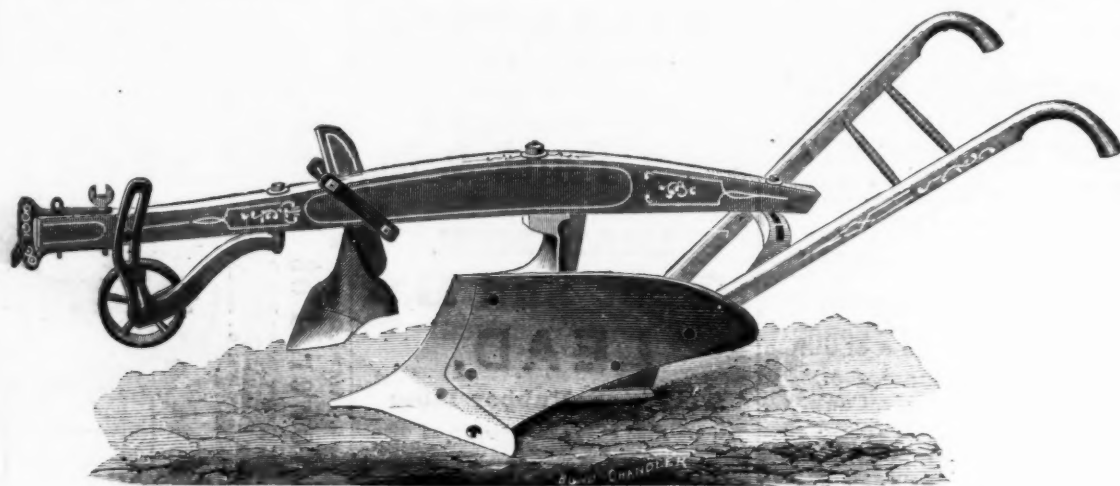
"England takes the leading place amongst iron producing countries, not only providing for the immense home consumption of her own numerous iron works, but finding a market

for her produce in almost every country of the world where the production of iron is inadequate to the requirements of consumption; and by this means she rules the iron market. In forming a correct opinion of the influence exercised by England upon the iron trade, the following statistical notes may be useful: In 1871 the production was 2,384,583,209 Austrian zoll-centners of coal, and 134,664,277 Austrian zoll-centners of crude iron. Of the objects exhibited by England (perhaps we may say of those exhibited by all countries), in the first group, that which attracted the greatest admiration was the exhibition of C. W. Siemens, C. E., although the objects exhibited were small in themselves, and not calculated to attract the attention of the passer-by. His exhibition was interesting and important for the progress, to which it bore evidence, and because it illustrated a process of manufacture which is in all probability destined to play an important part in the development of the iron industry. Siemens exhibited models and drawings of furnaces and apparatus for the direct production of iron and steel from the ore, without the intermediate process of smelting it into crude iron in the blast furnace. Specimens of the iron and steel made by this process, in the form of unfinished loops, skelps and steel produced by the re-melting of these objects, were also exhibited. Allowing that the process as it is applied at present has advanced beyond the stage of preliminary experiment, we can nevertheless

pointed projectiles, which fell together on a surface of nearly two square feet and penetrated nearly 6 inches deep, caused in one of Brown's armor plates of 9 inches thickness only a slight indentation and unimportant fractures at the back. Four similar shots on one of the armor plates of C. Cammell & Co. (Cyclops Iron Works), caused an indentation which was just perceptible at the back. Armstrong (progress medal) exhibited guns with steel cores, which were armed with iron rings and iron pipes, among others one breech-loading 9 inch gun of 290 centners, and a 10 inch barrel of 360 centners in weight. The details exhibited in illustration of the manufacture of the wrought iron pipes were instructive; there was a bar made of thin plates welded together and rolled into tubing of about 6 and 4 inches, also an armor ring welded, turned and exposed so as to illustrate the excellence of the welding.

Both Cammell, of the Cyclops Works, and John Brown & Co., were awarded the Ehren Diplom, diploma of honor—the highest award, and one which was bestowed with rigid scrupulousness.

"We have still to mention the manufacture of Edward Clarke, who exhibited very beautiful samples of straight shafts and shafts bent out of round bars; also, the Kirkstall Forge Company, of Leeds (progress medal), who showed tyres, steel axles, and an assortment of specimens, of all of which the quality was excellent.



THE OLIVER CHILLED PLOW.

New Method of Manufacturing Thin Iron Plates.

For some years past, thin iron plates have been manufactured in Belgium and Germany by a very remunerative process, to which the name of *Calmoterie* has been given. By the aid of two heating furnaces and a set of rolls, about 6000 plates from 1 to 3½ millimeters (.039 to .138 in.) in thickness, weighing 15 to 30 kilogrammes (33 lbs. to 66 lbs.) have been turned out every month. The plates are made up of 35 per cent. of old rails with 65 per cent. of scrap iron in the interior; they are transformed into plates at a single heat, without again going into the furnace.

The mill consists of a pair of gauge rolls, a pair of roughing rolls and a pair of finishing rolls. The first groove of the first pair is so constructed that the bloom receives a pressure as uniformly distributed over its surface as possible, so as to effect a perfect welding; the bloom is made in the form of a wedge, so as to facilitate its entrance. The second groove reduces the slab by one-fifth of its breadth, for the purpose of increasing the solidity of the iron, and of avoiding ragged edges. Next come four smooth rolls, the space between them being 70, 50, 30 and 20 millimeters (approximately 2¾, 2, 1½ and ¾ in.), which draw out the slab into a bar, varying in thickness with the intended dimensions of the plates; for those of 1 to 1½ millimeters (.039 to .059 in.) it is 20 millimeters (¾ in.), and for those of greater thickness, 30 millimeters (1½ in.). The bar thus obtained has a breadth of about 170 millimeters (6¾ in.) and a length varying from 13 to 16 decimeters (4 ft. 3 in. to 5 ft. 3 in.); this is cut into two by means of shears worked off an eccentric keyed on to the coupling box of the upper roughing roll. These two lengths are each destined to become a plate; to this end, they are passed between preliminary rolls, which are 125 centimeters (4 ft. 1½ in.) long, and are provided with an adjustment which permits of the bars being reduced, in five or six passes, into plates 65 centimeters (2 ft. 1½ in.) in length. The upper roll is counter-balanced as carefully as possible, so as not to strain the adjusting screws, which are thus easily worked.

The finishing is effected by the aid of chilled rolls 125 centimeters (4 ft. 1½ in.) long. After three or four passes, those plates which are intended to have but a slight thickness are placed one upon another, and in five or six more

passes, are reduced to the desired gauge. The rolls are 65 centimeters (2 ft. 1½ in.) in diameter, and make 55 revolutions per minute, the engine being of 100 to 120 horse-power.

All the work is done, as we have already said, at a single heat and without the aid of a re-heating furnace; this it is which constitutes the great economy of the manufacture. The plates weigh from 35 to 75 kilogrammes (77 lbs. to 165 lbs.) according to the dimensions of the plates required; but their weight is kept within the latter figure for ease of handling. Their breadth is a little less than the length of the roughing rolls; their thickness, previously reduced by a screw press, is 16 centimeters (about 6¼ in.) at the front end, and from 30 centimeters (about 7¼ in.) at the back end; the length varying from 55 to 85 centimeters (21 in. to 33 in.). The wedge form of the blooms facilitates their being gripped by the rolls at the same time that it permits of the slag running off more freely, since the hinter portion is less solid.

The rough-rolled iron which forms the outside is as thin as possible so as to keep down the expense of the raw product; its minimum thickness is about 16 centimeters (6¼ in.) a figure arrived at in practice. It is as well not to reduce the thickness below this amount for fear of cracks at the edge, which would lead to too much waste.

The heating furnace is constructed so as to bring the iron to a uniform temperature throughout the whole substance; the Boetius arrange-

ment compound their engines. Whereas, about ten years ago, the highest pressure for a mill boiler of the internally fired double furnace or "Lancashire" type was, as a rule, 60 lbs. on the inch, it is now 80 lbs., and in some cases 100 lbs., while in boilers of other constructions it is as much as 150 lbs. The recent coal famine has tended to quicken this movement, both as regards raising the pressure in the boilers and compounding the engines.

I have long been desirous of presenting the members in the monthly reports with copies of diagrams taken from some of the engines recently altered with a view to economy, coupling these diagrams with the coal account both before and after the alterations, so as to show the economic results obtained, whether by the adoption of the "compound" or "simple" engine principle. This I thought could not but be useful.

I will begin with a case met with at a cotton mill, in which there were six internally fired double furnaces, or "Lancashire" boilers, ranged in two separate series of three each. The boilers in one series had a length of 34 ft., a diameter in the shell of 9 ft. 9 in., and in the furnaces of 3 ft. 6 in.; while the boilers in the other series had a length of 32 ft., a diameter in the shell of 10 ft. 6 in., and in the furnaces of 4 ft. The blowing off pressure of all the boilers was 35 lbs. on the square inch. These six boilers drove four beam condensing engines, those connected to the first series of boilers being independent one of another, and those connected to the second series forming a pair with the cranks set at right angles. On remodeling these boilers all the old ones were removed, and in place of the first series three "Lancashire" boilers were laid down, with a blowing off pressure of 80 lbs.; and in place of the second series four "Lancashire" boilers were laid down, with a blowing off pressure of 100 lbs. In each case there was a spare boiler, and the dimensions as nearly as may be were—length 27 ft., diameter in the shell 7 ft., and in the furnace tubes 2 ft. 9 in. On remodeling the engines they were all compounded by means of cylinders laid horizontally, or nearly so. In the case of the single beam engines an additional crank was added at the fly-wheel end of the shaft, and in the case of the pair of engines the crank pins were lengthened, and the additional cylinders coupled directly thereto. All the high pressure cylinders had cut off slides working on the back of the exhaust slides, each having its own independent eccentric, but the expansion apparatus was not regulated by the governor, nor were any of the cylinders steam jacketed. After remodeling the boilers and engines the consumption of coal per week was 80 tons. Before remodeling it was 180 tons, so that 100 tons of coal a week was saved by compounding and raising the pressure to 100 lbs. in one series of boilers, and 80 lbs. in another. The consumption of coal per I. H. P. per hour was reduced from 8.2 lbs. to 3.9 lbs. These returns are in the gross. The firm estimate that ten tons should be deducted for the steam drawn off for sizing, and without making any deduction for heating the mill. This would reduce the coal consumption per I. H. P. to 2.7 lbs. A weekly saving of 100 tons of coal, at a cost of 13/6 a ton, which the firm were paying a short time since, amounts to about £3300 per annum.

Metallic Alloys.—German silver and other alloys have been used for forks, spoons, and other articles of table ware; and the same have been plated with silver, and also with nickel. When this plating is worn off, the metal, being of a different color, appears in a very objectionable manner; and, beside this, the metal is comparatively soft and liable to bend, and it is not adapted to use as a knife, because the edge will not remain sharp. Beside this, the silver of the plating is an entire loss after the plating is injured or worn off. To remove these objections, Mr. Howell Wright, of Glastonbury, Conn., proposes an alloy of silver which is cheap, very strong and elastic, and hence, especially adapted to use in the manufacture of forks, spoons, knives, and other articles of table ware, and thereby dispensing with nickel or silver plating; but the alloy is not limited in its use to these articles, but may be employed for any object to which it is available. The alloy consists of silver, 25 parts; nickel, 18; copper, 35; and zinc, 22=100 parts. The copper and silver are to be first intimately melted with a suitable flux, such as lime, chalk or borax, or two of these materials, and to these the nickel is added. The nickel will melt with ease when thus introduced. The zinc is added and thoroughly mixed. This is preferably performed below a covering of silica, and a rod of plumbago can be used for stirring. This alloy is adapted to being rolled, forged, or otherwise worked, and it requires annealing from time to time. The resemblance to pure silver is very close, and the metal is capable of receiving a high polish, or of being burnished. The cost of plating is avoided, and the silver that is introduced is always available, as the alloy can be melted and worked up into different forms without loss, or the silver extracted.

Economy of Fuel in Steam Boilers.

Mr. Lavington E. Fletcher has presented to the Executive Committee of the Manchester Steam Users' Association a report, in which there occur the following remarks: The desire on the part of boiler owners to economise fuel has for years past led them to work steam more expansively, and to this end to raise the pressure in their boilers, and in many cases to

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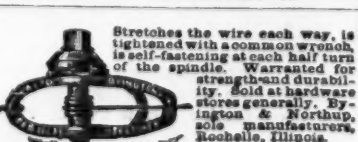
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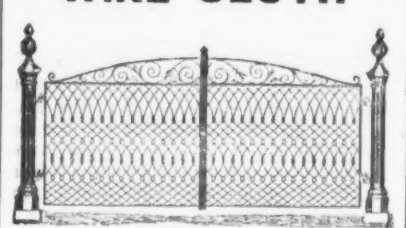
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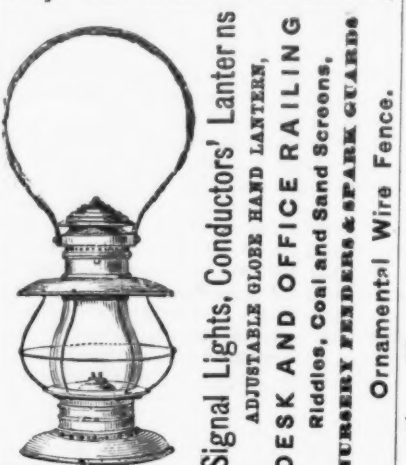
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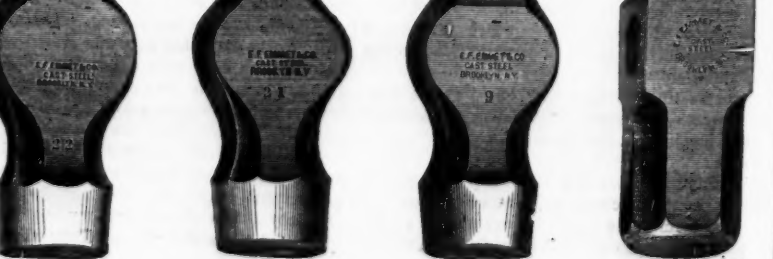
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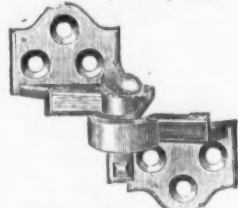


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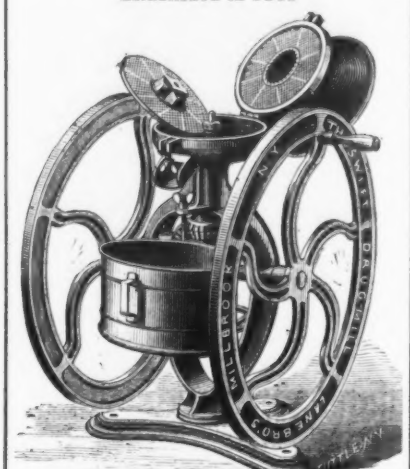
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A New Coal Terminus.

During some years past the Delaware, Lackawanna & Western Railroad Company, for the privilege of running their cars over the branch railroad which leads to Elizabethport, have been paying the New Jersey Central Railroad Company a certain percentage for every ton of coal that passed over the rails of the latter. This was in conformity with a contract entered into between the two companies, which has been extended from time to time, and which expires by limitation on May 1, 1875. The Delaware, Lackawanna & Western Railroad Company have notified the other company that after that time it will not use the latter's rails, and does not care to renew the lease. In anticipation of the expiration of the lease, the lessees have been making preparations to have a vast store house for coal erected at Hoboken—the eastern terminus of the road. Land adjacent to the railroad has recently been purchased, and immense sheds are in process of erection to accommodate all the coal which shall pass over the road. Beside the extensive docks and water front now possessed by the company at Hoboken, where from 3,000,000 to 4,000,000 tons of coal can be stored, the company is now building a large canal which will afford accommodation to vessels of the largest tonnage. This canal is 3000 feet long, 100 feet wide, and will have a depth of 18 feet of water when completed. The most cordial feelings exist between the two companies, but it is manifest to both that the improvements now making at Hoboken are intended to draw the shipping coal trade from Elizabethport to Hoboken, and it is urged that with equal facilities, the latter will be the most desirable depot of distribution. The reasons advanced are its nearness to New York, the saving of time, the facility with which the coal may be obtained; while the inducements held out by the railroad company are quick delivery and lower rates. It is proposed to carry the coal to Hoboken at the same rates or lower than to Elizabethport, and it is claimed that with all these inducements the coal depot will soon be transferred. The New Jersey Central Railroad have announced its intention, after May 1st, of taking up the third rail (which it was compelled to retain so long as the other company used its tracks), and abandon the broad gauge in the future. This will in turn reduce the expense of carrying its coal to the port, and the result will probably be, as is already intimated, a reduction of rates on this line also. Mr. Sloan, president of the Delaware, Lackawanna and Western Company, stated on Saturday that these changes were in perfect accord with the conditions and termination of the contract, and implied no ill will between the companies. He thought, however, that with the vast facilities which his road possessed at Hoboken to make a grand coal depot for New York, the result could not but be most favorable to the road, beneficial to the dealers in coal, and advantageous to the community at large. He said that when the tunnel is completed, which he thought would be in eighteen months' time, the advantages gained from the establishment of the coal depot at Hoboken would be manifold. He stated that the tunnel is making very rapid progress. Six shafts have been cut down to the grade of the road, and at both the east and west ends large forces are working. The railroad on the east of the tunnel will pass over the streets on masonry abutments, the contracts for which have already been given out. On the west side the road will be carried over the Erie Railroad tracks. These numerous improvements, it is claimed, will make that road the great carrying line from the coal regions direct to the city of New York. The expense of carrying, it is asserted, will be reduced, and the facilities for delivering to dealers and consumers will be, it is stated, greatly increased. The result will be immediately to reduce the price of coal in the city.

Management of Mines in Prussia.

The British Secretary of State for Foreign Affairs, having applied to the diplomatic representative at Berlin, has received particulars relative to the general management of mines in Prussia, and also respecting the government mines. The Prussian Minister of Commerce, Trade and Public Works, is at the head of the Prussian administration of mines, which forms the first of the five departments of the ministry of commerce founded in 1848. The Department of Mines, Furnaces, and Salines, is placed under a chief director of mines, as representative of the minister. The administration of mining affairs is represented by a three-fold system of control, according to the general mining law of Prussia, of June 24, 1865, by the district inspectors, the superior mining boards, and the Minister of Commerce. To the provisions of this law, private mines as well as mines purchased and worked on government account, are subject.

To the competence and authority of the minister belong especially the preparation, so far as regards co-operation in the Legislature, and publication of general administrative directions in aid of such undertakings; the exercise of the government authority, in the highest instance, as regards the search for and obtaining of mineral products excluded from the proprietors' rights of disposal (leasing of mining property, giving up of ground and soil to mining objects, &c.), and the police supervision of mines, subject to the provisions of the above mentioned law. The minister also has the appointment of the district inspectors; the control of the imposition and collecting of the mining dues, subject to the dispositions of the law; and the superior administration and management of all treasury or government mines, furnaces, and salines, as well as of diggings for phosphorite, gypsum, and chalk pits, so far as they are worked on government account, and

from their extent demand a technical supervision. On the other hand, in matters of mining police, and as regards the discipline of the officials, the government mine administrations are put under the control, in the first instance, of the superior mining board of the district in which they are situated. The minister further has the management of the technical works on government account for geognostic surveying; of the scientific, cartographic, and literary works in the general interests of mining industry of the higher schools of mining, and the care of collections in this branch; and the supervision of the education of those employed in the higher branches of mining engineering. The police inspection of private furnaces was by law of June 10, 1861, given over to the Tribunals of Commerce, and, therefore, belongs at present to the competence of the fourth department of the Ministry of Commerce.

The district inspectors exercise, as individual officials, the police control of the mines in their district, which, in accordance with the above mentioned law, extends to the safety of the workings, of the life and health of the miners, the care of the upper surface in the interests of personal safety and public traffic, and to precautions to be taken against influences generally injurious. Moreover, the inspectors are the agents of the superior mining boards, of which there are five, viz., at Berlin, Halle, Dortmund, Bonn and Clausthal, in all questions respecting leases, expropriations, taxes, labor, &c. The local administration of each of the government establishments are organized on the directorial principle under various denominations, inspection of mines, forge and salt mine superintending boards. The inspection of the government coal mines is subject to the control of a mining board at Saabruck. The local mining police, as regards the government establishments, is exercised either by the regular district inspector, or by the mining superintendent, so far as the competence of the district inspector is given by the Minister of Commerce to the latter. The technical management and economy of the mines is conducted independently of the local superintending inspectors, under the direct management and control of the ministry. The yearly salary of the inspectors varies from 800 thalers (£120) to 1500 thalers (£225) and averages about 1150 thalers (£172. 10/); beside, these officers receive fees for examining boilers, payment of travelling and office expenses, and allowance for house rent. The yearly pay of the mining superintendent varies from 1200 thalers (£180) to 2000 thalers (£200) with house free and office expenses paid.

The government administers its coal and metal mines through the above mentioned mining officials (mining board directors and mining superintendents), on account of its own treasury. The Crown of Prussia does not own any property of this kind. The government mines are not, as a principle, let on lease, and when in isolated cases certain bits of the government seams or veins have been let to other parties, they are only most insignificant lots, which, on account of their unenviable position, cannot conveniently and properly be worked on government account. The rent is then based on the measuring unit of the gross produce, a yearly minimum of production being fixed for that purpose. Private mines in Prussia are subject to a special tax on the sale of the raw produce. This amounts to 2 per cent. of the gross receipts.—Capital and Labor.

Improvement in Alloys of Nickel, Zinc and Copper.—A new alloy is described, which consists of American commercial nickel (which contains about 25 per centum of copper) and zinc in about the proportion of 100 pounds of zinc to from 25 pounds to 34 pounds of the American commercial nickel.

The nickel is improved for the purpose of this alloy by a preliminary process of refining as follows: Take, say, 100 pounds of the nickel, melt it, and continue the heat till the nickel bubbles. If the melted nickel shows traces of dirt, cobalt, or iron, add about two ounces of soda ash as a flux and stir till the nickel boils or bubbles in the center. If the nickel shows cobalt in excess, add about two ounces of nitrate of soda as a flux, and stir until the nickel again boils in the center. If the nickel shows arsenic, common salt in same quantity may be used as a flux. If the nickel shows sulphur, carbonate of soda in about the same quantity may be used as a flux. The nickel may now be cast into sheets, and is refined and purified.

The alloy is to be produced by melting the zinc in any proper manner, as in a crucible, keeping the zinc covered meanwhile with powdered charcoal or other equivalent carbonaceous matter. The heat is continued after the zinc is melted under the cover of the charcoal. When raised to a trifle above the melting point of copper the nickel is added in small strips or pieces, and the heat continued till the whole is melted, the melting metal being kept covered all the while with the powdered charcoal, and when melted the alloy is cast into ingots, the charcoal flowing out with the alloy and forming a coating on the ingot. The whole is allowed to cool together.

This alloy is specially useful in making German silver. By remelting this alloy under charcoal as before, and adding copper till the per centum of nickel is reduced to anywhere from one to twelve per centum of the whole, a good German silver may be formed, the richness of the metal varying with the per centum of the nickel.

When added to any metallic compound containing copper, it bleaches and strengthens it.

Common pin metal is usually composed of two parts of copper and one of zinc. By adding this till there is a full quarter more of zinc in the composition, a cheaper article, and at the same time a better one, may be produced.

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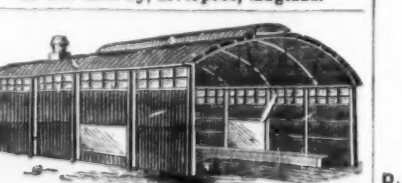
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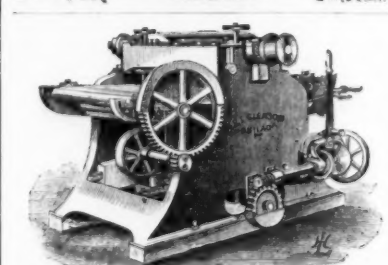
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Iron Piers.

Of all braced structures, an iron pier, built
according to the principles of modern engineer-
ing, depends more than any other for its security
and durability upon the manner in which the
bracing of the component parts is designed and
executed. As the type for an illustration we
may select a pier consisting of three principal
parts, viz: iron piles, driven or screwed; iron
superstructure, solid or open, and timber plat-
form or decking. If we restrict our selection
still further, and make the foundations cast
iron hollow screw piles, the superstructure lat-
tice girders, and the decking narrow planks
close jointed, we shall probably arrive at the
description of pier possessing the minimum
amount of inherent rigidity, demanding at the
same time the maximum amount of extraneous
stiffening and bracing, and yet capable of being
erected with all due regard to both seculitic
designing and permanent economy. A pier
built in the manner described may fall in var-
ious ways; thus the holding powers of the piles
may be insufficient; they may be bodily up-
rooted, and the whole superincumbent structure
come to the ground, or fall into the water, as
the case may be, and the same result might also
be produced by the scouring out of the ground
at and around the piles. At home, this disur-
bing cause is not likely to occur, but it is by no
means an uncommon event in India and other
foreign countries, where rivers have been known
to scour out their beds to a depth of nearly 40
feet in a single night. In ordinary cases, the
precautions used against the uprooting of the
piles are a screw blade of sufficient diameter,
the proper pitch of screw, and a penetration
into the bearing stratum to the extent required.
The first two of these conditions are generally
complied with, but the third, from motives of
false economy, is very frequently violated.
Directors of companies are very prone to cut
down estimates so closely that an engineer will
sometimes cheapen a design in the simplest
manner possible. This, in the case of an iron
pier, is readily effected by diminishing the
depth to which the piles are to be screwed,
without in the least degree affecting the rest of
the structure. Nothing can be more injudicious
or short-sighted. An engineer had better fine
down his material, use second-rate timber, and
employ any alternative to bring, if possible, the
cost of the structure within the prescribed lim-
its, than diminish by a single inch the holding
power required for the piles. Damage done to
the superstructure can be repaired with com-
parative facility, but if a few piles happen to
give way, the whole structure is in jeopardy.

While all the component parts of an iron pier
should present as little surface as possible to
the action of the waves, yet a certain amount
of strength, and consequently, of material, is
indispensable. But it is with regard to the
decking that especial precautions must be taken
to avoid the force of the sea. Obviously, if the
upward pressure of the water were once brought
to bear upon the under surface of the deck,
nothing could prevent it being lifted off the
girders, or as it is commonly called, blown up.
We do not suppose that any engineer would
arrange the levels of a pier in such a manner
that this catastrophe would happen under
ordinary or even extraordinary tides. But the
question of storms must be taken into consid-
eration, and in connection therewith another point
must be noticed. In order to blow up the deck
it is not necessary that the waves should actu-
ally come into contact with its under surface,
especially if the breadth of the pier be upward
of 40 feet. The rising of the sea in a heavy storm,
together with the violence of the wind, may so
compress the air in the confined space between
the surface of the water and the under side of
the deck, as to produce precisely the same re-
sult as if the waves themselves rose to the deck
level. It might be imagined that a remedy
against this contingency might be easily pro-
vided by the simple expedient of laying the
deck boards with a space of about an inch or
thereabouts between them. Under certain cir-
cumstances, there can be no doubt that this
precaution would prove advantageous, but it is
quite a mistake to suppose that it would prevent
the blowing up of the deck in the event of the
waves acting during a severe storm in the man-
ner already described. The suddenness of the
shock and the velocity of its action would
easily start or break the planks. Beside, small
spaces between deck boards after a time usually
become more or less choked up with dirt and
grit, so that even the partial advantage derived
from their adoption is considerably diminished.
We are not to be understood as condemning
the practice of employing open decking. On
the contrary, in certain cases it should always
be adopted. When a pier is erected solely for
the purpose of trade and commerce, and for
the loading and unloading of goods, it should
always be used. What we intend to imply is,
that its advantages as a means of increasing the
security of the structure are frequently much
overrated; in consequence, other necessary pre-
cautions are neglected or treated as of second-
ary importance. The decks of piers intended
to serve as resorts for fashionable promenade,
such as those at Brighton, Hastings and else-
where, are best closely laid and well caulked.
Apart from other considerations, open decking
should be employed whenever practicable for
reasons of economy. Not merely are fewer
squares of planking required, but the expense
of caulking is avoided, which is a serious item
in the total cost.

The proper method for obviating the danger-
ous tendency of the waves to blow up the deck
of a pier is to place it at a sufficient height
above high-water mark. Here again, from mot-
ives of false economy, an error is likely to be
made. An increase in the height of a pier ne-
cessitates a corresponding increase in the cost
of the whole of the substructure, and in some
instances in some portions of the superstruc-
ture as well. The pier at Blackpool, in Lanca-

shire, is an example in which this mistake was
originally committed. During its erection—
which owing to the unfavorable weather made
at first rather slow progress—storms which oc-
curred in the autumnal months indicated that
the structure was being placed at too low a
level. Fortunately, there was time to profit by
the warning, and the whole pier was raised
three feet higher than had been originally con-
templated. While having due regard to the
height of the pier with reference to the protec-
tion of the deck from the action of storms,
that dimension must not be increased beyond
what is required, not only for the reason al-
ready given, but because the difficulty of access
is thereby enhanced. So far as a promenade
pier is concerned, this last consideration is
perhaps, not of much importance; but it be-
comes one of the points demanding the great-
est care and attention when the structure is
erected to accommodate the trade of a place.
There is always a natural desire on the part
of the proprietors of piers, wharves and land-
ing-places, to lessen the lift as much as possible,
and it is therefore no wonder that under the
circumstances the level of the surface is some-
times too low. The cause of the inundation
which in March last laid under water a large
portion of the districts of South Lambeth, on
the Surrey banks of the Thames, was the fact
that the level of the top of the walls of the
various wharves was not sufficiently high. The
extraordinary tide which occurred in the river
at that time reached in some cases to a height of
more than a foot over the walls.

The weakest portions of a long pier—that is
one which is not less than a quarter of a mile
in length—are, in a constructive sense, the shore
end, or commencement, the central part, and
the termination or head. We may consequently
divide a pier into three parts, each of which
ought to be able to stand alone without the as-
sistance of the intermediate connecting lengths.
In other words, if we suppose these interme-
diate lengths to be carried away by a storm,
these three nuclei, or *points d'appui*, ought to
remain intact. On the other hand, if the latter
are destroyed, the intermediate parts will go
likewise, and are not expected to do otherwise.
Viewing the subject in another light, the actual
erection of the pier may be carried on in one of
two ways. The work may advance, as is
usually the case, gradually and progressively
from the shore; or the shore ends, central part
and head may be first constructed, and the re-
mainder subsequently added. Whichever
course may be adopted—and supposing the
theoretical assumptions respecting the stability
of the three points to prove true in practice—
there would still remain the chance of the in-
termediate portions being carried away before
they formed part and parcel of the whole con-
tinuous structure. The absence of this con-
tinuity between what are assumed to be the
self-supporting parts of the pier, constitutes the
danger and risk incurred in its erection. It is
far more likely to suffer from the effects of
stormy weather while in a disconnected and
incomplete condition than when in a finished
state. The whole structure is so braced that
it cannot sway laterally, and any tendency of
this kind in a longitudinal direction must be
counteracted by the pier being immovably tied
at the shore end, at the central part, and at the
head, or at any rate at the first and third of
these points. Too much care and attention can-
not be bestowed upon the bracing of the head
of a pier. As a rule, the heads of piers are too
small, and do not afford that strength and
stability which they not only require them-
selves, but which are also necessary to the
security of the rest of the structure.—Engineer.

File Cutting Machinery.—Dr. G. Hasel-
tine, of Southampton-buildings, London, has
taken out a patent for machinery for cutting
files. The invention relates to a file cutting
machine in which a bed is used that rests di-
rectly upon the feed screw, the said screw being
of sufficient strength to support the bed while
the file is cut. The feed-motion of the screw is
produced by a ratchet wheel and pawl, and with
these parts is combined a spring which acts on
the cover of the journal box at one end of the
feed screw, the cover being supported by an
eccentric. The bed is saddle shaped, and with
it is combined a frame with parallel motion
links, for the purpose of lifting the bed out of
gear with the feed screw. This bed is provided
with a cavity to receive a semi-cylindrical sec-
ondary bed, and with these two beds is com-
bined a gauge, which bears on the secondary
bed and maintains the surface of the file blank
parallel with the edge of the cutter. The file
blank is retained on the secondary bed by clamp-
ing jaws and a spring. The stock which carries
the cutting tool moves between guides or slides,
which can be set to insure accuracy in the move-
ment of the cutter. The tool stock is operated
by compressed air.

Superior iron ore has been found in Perry
county, Pa. There have been two analyses
made from this ore by Professor Hollenbush,
with the following results: The ore taken from
near the surface of the vein yielded the follow-
ing constituents:

Sesquioxide of iron.....	51.40
Lumina.....	19.64
Manganese.....	trace
Carbonate of lime.....	8.53
Insoluble silicious matter.....	7.15
Water and loss.....	1.78
Total.....	100.00

At a depth of 40 feet on the vein the following
results were obtained:

Sesquioxide of iron.....	68.20
Alumina.....	7.51
Carbonate of lime.....	10.28
Insoluble silicious matter.....	9.21
Water and loss.....	4.70
Total.....	100.00

A charter has been obtained and president and
directors have been chosen to construct a line
of railroad from the county town of Perry
county, a distance of seven miles, to connect
with the Pennsylvania Railroad 25 miles west
of Harrisburg

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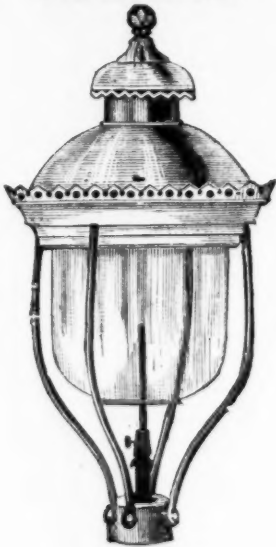
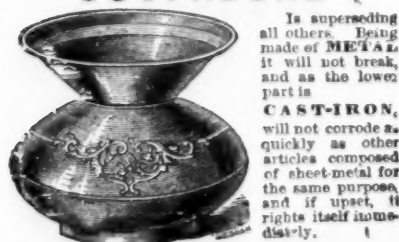
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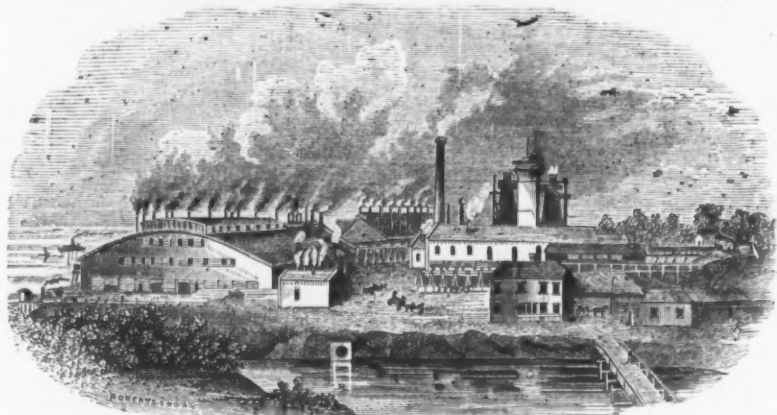
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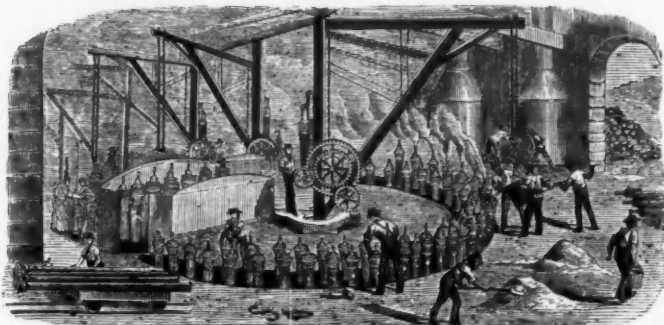
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 Office, 1321 Fairmount Ave., Phila.
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Manufacturer of
 Rules, Planes, Iron Planes, Grooving Plows, Gauges, Plumbs and Levels, Hand Screws,
 Bench Screws, Handles, Door Stops, Try Squares, Sliding T Bevels, Turning Saw Frames
 and Saws, Schell's Patent Gauge, Butler's Patent Gauge, Boring Machines, &c., &c.
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Having great facilities
 for doing cheap work as
 well as costly, using Way-
 moth's variety turning lathe,
 which in many kinds of
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 at least one-half, we are
 prepared to furnish paten-
 tees and dealers with fin-
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Iron.

CAST IRON FLANGE PIPES

Of any length or diameter, for Steam Engines, Exhaust Steam, Fire Purposes, Refractories,
 both Faced and Drilled and Plain Also.



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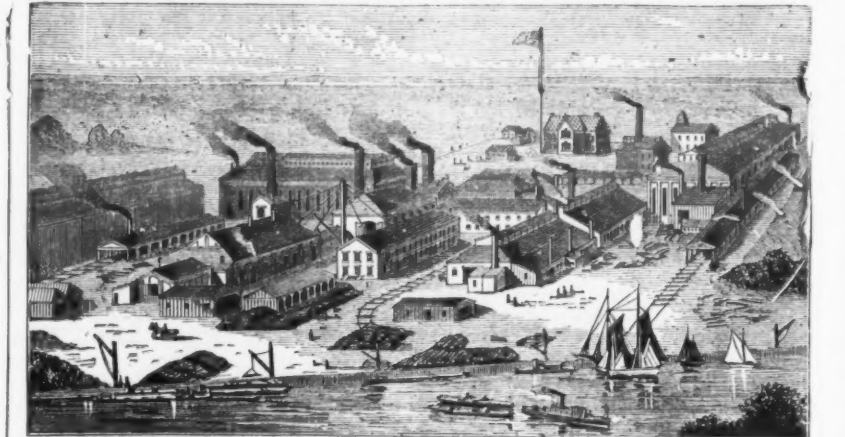
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Engineers, Contractors and Manufacturers of Gas Apparatus.

And all the
 Buildings, Tanks, Holders, &c., required for the Manufacture, Purification, and Storage
 of Gas, and Street Mains Requisite for its Distribution.
 Plans, Drawings, and Specifications promptly furnished.

IRON FOUNDERS.

CAST IRON STREET MAINS, for Water and Gas, from One and a Half Inches to
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 Stop Valves (all sizes), FIRE HYDRANTS, HEATING PIPES, BRANCHES, BENDS, TEES
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PROPRIETORS OF THE

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POTTSVILLE, PENNSYLVANIA.

Having introduced New and Improved Machinery into their Rolling Mills, and manufacturing all their
 Iron from the ore, and also doing all Machine Work and Repairs in their own shops, they are enabled to
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RAILROAD IRON

Of uniform quality, unsurpassed for strength and wear, and of any required length.
 Address the Proprietors Pottsville, Pa.

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ALL DESCRIPTIONS OF IRON RAILS

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ALFRED FIELD & CO.,

Importers,

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Reasons for Using our Goods.

Hogs when ringed are prevented from rooting, and fatten quickly.

Pastures and clover fields are kept smooth and are not destroyed by the hogs rooting them up.

Feed lots in the winter are kept smooth, and corn that is otherwise rooted and tramped into the ground is saved.

The **Triangular Wire Ring**, manufactured only by us, is the only wire ring that can be inserted in the hog's nose with a grip on the **Ring**, and is the only ring that will remain in a hog's nose, as it fits close, will not turn in for the joint to irritate the nose, is not liable to be torn out, and heals quickly.

No puncturing of the nose required to insert our ring.



For sale by the Leading Jobbing Hardware Houses of New York, Philadelphia, Baltimore, Cleveland, Columbus, Cincinnati, Boston, Indianapolis, Lafayette, Chicago, Milwaukee, Burlington, Davenport, St. Louis and San Francisco.

SOMETHING NEW.

We shall this present season make a **Heavy Tinned Wire Ring** that will not rust in the hog's nose. The strongest and best ring in the market.

Prices.

Rings, retail\$1 00
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Rings per box (100) copper wire 50
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Tongs or Holders retail 1 25
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The copper wire ring will be sent unless otherwise ordered.

Samples by mail postpaid on receipt of retail price.

Goods sent C. O. D. with privilege of examination before paying charges.

Net prices in quantities, circulars and posters mailed free.

Our advertisements are now inserted in over 1800 newspapers, published in every State of the Union, so that dealers will find large demand created for our goods.

THE NICHOLSON FILE.

All *Nicholson Files* are cut with the Patent *Increment Cut*, an invention owned and controlled exclusively by us, the file cut in this manner being Patented as a new article of manufacture, and differs from all other machine cut files (all of which have their teeth cut with equal spaces) by being cut with teeth slightly *expanding or increasing in size and space from the point*, thus avoiding the too great regularity of teeth common to all other machine cut files. The tendency of all cutting tools with teeth or cutters placed at regular distances from each other may be illustrated (to the machinist at east) by the fluted reamer—as it is well known that if a round reamer be made with (say 12) teeth whose spaces are equidistant, the hole reamed will *not* be round and smooth, but will approximate to a hexagon in shape. Whereas, if the same number of teeth be made of irregular distances, the hole reamed will be both round and smooth. The same is true of a file, hence the necessity of its having teeth at unequal distances, and to which we have applied the name of *Increment Cut File*, which possesses all the advantages of hand cut work, and the accuracy and uniformity of machine work. It is now upwards of seven years since this File was introduced to the public, and the demand has increased until our production is undoubtedly treble that of any File manufactory in the country.

We put all files under seven inches in boxes of either one-half or one dozen each. These boxes are neatly arranged, and open on the end, on which the kind is plainly marked with printed labels, acknowledged improvements on the old methods.

The "*Increment File*" is not an experiment, but an established fact, and already has acquired a legitimate demand or upwards of 500 dozen per day. We employ no *regular Travelers*, but our goods may now be found in the hands of the principal jobbers and dealers throughout the country.

Prices and terms will be forwarded on application to

NICHOLSON FILE COMPANY,
Providence, R. I.

USE THE BEST.



Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

FILES
AND
RASPS.
XTRA QUALITY,
MADE FROM THE BEST
IMPORTED STEEL
BY THE
Auburn File Works,
AUBURN, N. Y.

JOHN ROTHERY'S
Celebrated Hand-Cut FILES,
Made of Best English Cast Steel.

WALSH, COULTER & FLAGLER, Sole Agents,
83 Chambers and 65 Reade Streets, N. Y.

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MANUFACTURERS OF AMERICAN HARDWARE.

Axes & Tails' Pat. Wrenches. Moose Traps. Wire Selves. Yaw's Cow Bells. Axes, Picks and Hatchets. Hammers. Crow Bars. Nail Irons. Boring Machines. Cast Iron Hatchets. Coffee Mills. Star Steel Spoons. Stocks and Dies. Handles. Patent Tap Borers. Tool Chests. Clinch Horse Collars. Braided Horse Nails. Haguire's Wrt Iron Goods. Shattuck's Platform Counter Scales. Augers and Auger Bits. Ocean Nut Drivers.

DEAN'S New Patent (1873)
Screening Scoop
SHOVEL

For Coal, Coke and Coal Ashes, and other Substances.

The largest frames are 12 by 18 inches, with seven bars, and are made of the Best Malleable Iron. They are, or can be, wired between bars by an arrangement of holes a quarter of an inch apart, by an ordinary person, to screen any size substance desired. They are warranted to be the most durable and practical Screening Shovel made, or money refunded. Reference—All New York Gas Companies and Hotels.

Smaller sizes on hand. Please address orders to
A. SEE & SON,
N. Y. Shovel Works,
1358 Broadway, N. Y.
Price: Largest size \$30 per doz., and upwards, according to size of spaces.

Clement & Hawkes Mfg. Co.,
Manufacturers of
SHOVELS,
Planters' Hoes, Trowels and Machinery.
Northampton, Mass.
Send for Circular and Price List.

Schweitzer Mfg. Co.,
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IMPORTERS & JOBBERS.

Established 1816.
Peter A. Frasse & Co.,
95 Fulton Street, New York,

SOLE AGENTS FOR

Thomas Turner & Co.'s Suffolk Works,
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FILES AND HORSE RASPS,

And Importers of

STUBS' FILES, TOOLS & STEEL,
W. J. Davies' Sons' London Emery Cloth,
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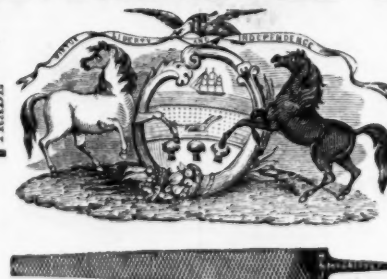
EVERY FILE WARRANTED.

Equal to the
BEST.

Western Files.
Works, Beaver Falls, Pa.
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Office, 96 Chambers St., N. Y.
Western Files.
LARGEST CAPACITY
Of any File Works in the World.
In the face of strong prejudice against American files, this brand has earned a reputation second to none. The trade in all sections testify to their excellence. We confidently offer these files as superior in every respect and cheaper than any first-class file in the market. A trial will confirm their reputation.

PENNSYLVANIA FILE WORKS.

Illustrated Catalogue
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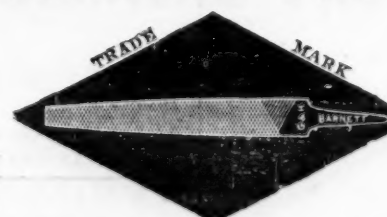


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McCAFFREY & BROTHER,
Manufacturers of **FIRST QUALITY FILES and RASPS ONLY,**
Nos. 1732, 1734 & 1736 North Fourth St., Philadelphia, Pa.

Black Diamond File Works.

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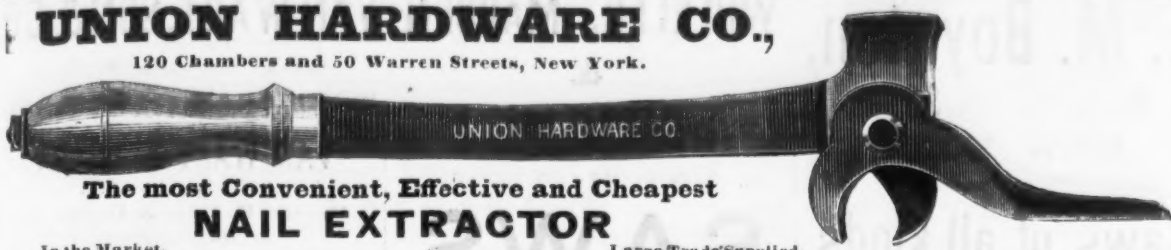


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LINFORTH, KELLOGG & CO.,
Sole Agents for the Pacific Coast, 3 & 5 Front St., San Francisco, Cal

UNION HARDWARE CO.,

120 Chambers and 50 Warren Streets, New York.



**The most Convenient, Effective and Cheapest
NAIL EXTRACTOR**

In the Market.

Large Trade Supplied.

**A. FIELD & SONS,**

TAUNTON, MASS., Manufacturers of

Copper and Iron Tacks, Tinned Tacks,

SUPERIOR SWEDES IRON TACKS, for Upholsterers' Use, Saddlers' Supply, Card Clothing, etc., etc.

American and Swedes Iron Shoe Nails,

Zinc and teal Shoe Nails, Carpet, Brush and Gimp Tacks, Common and Patent Brads, Finishing Nails, Annealed Trunk and Clout Nails, Hob and Hungarian Nails,

Copper and Iron Boat Nails, Patent Copper Plated Tacks and Nails

Fine Two Penny and Three Penny Nails, Channel, Cigar Box and Chair Nails, Leathered Carpet Tacks, Glaziers' Points, etc., etc.

OFFICES AND FACTORIES AT TAUNTON, MASS.

WAREHOUSE AT 35 CHAMBERS STREET, NEW YORK, where may be found a full assortment of Tacks, Brads, &c. for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above named goods made from samples, to order.

Hopkins & Dickinson Manufacturing Co.,

FINE METAL WORKERS,

69 Duane Street, N. Y.

Works, Darlington, N. J.

Hand Made Locks and Real Bronze Hardware.

NEW AND ARTISTIC DESIGNS FOR

Private Residences, Banks, Churches and Public Buildings.

THE CELEBRATED

YALE LOCKS

ORNAMENTAL

Real Bronze Hardware,

YALE LOCK MFG. CO.,

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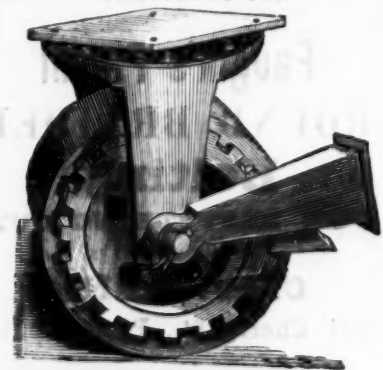
Salesroom, No. 298 Broadway, NEW YORK.

**Anti-Friction Metal,
INGOT BRASS, BRASS CASTINGS.**

Du Plaine & Co.,

1303 & 1305 Buttonwood St., PHILADELPHIA.

Gold Medal 1st M. in Exposition, O. C. 1874.
Endless-Lever House & Weight Mover.
Patented January 14, 1873.



Send for Circular and Price List.
THE REAMY TRUCK CO of Baltimore Md.
Incorporated, Oct. 1874. Reliable State Agents Wanted.

OTIS PASSENGER AND FREIGHT ELEVATORS

FOR HOTELS, OFFICE BUILDINGS, STORES,
WAREHOUSES, FACTORIES, MINES,
BLAST FURNACES, &c.

OTIS BROTHERS & CO.SOLE MANUFACTURERS,
348 Broadway, New York.**BUSINESS ITEMS.****PENNSYLVANIA.**

The Jackson & Woodin Manufacturing Company, of Berwick, have received an order from Col. R. E. Ricker, Superintendent of the Central Railroad of New Jersey, for 500 coal cars, 1000 pairs of wheels and axles, and 2000 draw hooks; also, an order for a lot of passenger car wheels.

The Allentown Iron Company is making preparations to get the iron it mines in Longswamp and Maxatawny shipped by way of the Catasquiqua & Fogelsville Railroad. They intend building a wharf at Farmington, and another one at Kline's Corner. How much they will save on this change we do not know. Capt. Joseph Andrews, of Trexlerstown, has received the contract for raising the ore at Jonathan F. Ziegler & Co.'s ore bed.

The Neshannock Iron Company's furnace, generally known as the "Red Jacket," 15 feet high, 60 feet high, with a 72 horse-power engine (built by the Globe Engine Works, Cleveland), is the "boss," having made, in the week ending Dec. 12th, 353 tons foundry iron, and in the week ending Dec. 19th, 373½ tons of open gray forge iron. If there is a furnace of the same size that can equal this, we would like to hear from it. We understand that Mr. S. Runser, of Sharon, is making a large iron rooster to present to the proprietors of this furnace, which they intend placing on the top of the hoist house, and will cheerfully take it down and present it to any furnace of the same size that surpasses their production. Who wants it?—*New Castle Courier.*

The iron mill of Messrs. Lewis, Oliver & Phillips, of the South Side, Pittsburgh, resumed operations a short time since, and is now running on full time, the above firm having purchased of McNight, Porter & Co. all the muck iron on hand.

The workmen in the shops of the Pennsylvania Railway Company, at Altoona, commenced to work nine hours a day on the 2d inst. After all efforts to extinguish the fire in the Wilkesbarre Iron and Coal Co.'s mines, in Luzerne county, by flooding them with water, had been abandoned, the experiment of forcing steam into them was tried. For months, day and night, the mines have been sealed, and all the steam that could be generated by the most approved apparatus was thrown into them. On Nov. 30 the steam was discontinued, and on Dec. 28 explorers entered at the "Empire" mine, and after carefully threading all the chambers except those that were charged with "fire damp," and coming out at the "Conyngham," they reported the fires all out and the result a perfect success.

The Allentown *Chronicle* of the 5th says: The Lehigh Iron Company made six thousand tons of pig iron during the six months ending December 31st, 1874. During the whole of this time only one stack was at work, and the product is looked upon as a pretty heavy yield, especially as about three-fourths of it was X 1 iron.

We learn that operations at the United States Iron and Tin Plate Works, near McKeesport, have been suspended. This is said to be in part due to the incompetence of the manager, and partly to the lack of sufficient capital on the part of the company. It is regarded as probable that the company will be re-organized and operations commenced again at no distant day.

Sehaal, Hoveler & Co., Pittsburgh, are making three oil tanks, each 80 feet in diameter, for the oil region. They have recently put in a bid for a new blast furnace to be built in West Virginia.

One of Shoemaker & Co.'s furnaces, Pittsburgh, has been out of blast for some time, and last week the other was blown out, it needing a new lining, back wall and other repairs. The repairs are now being made. Of the eleven furnaces in the city, five are now blowing, and six are out.

The Warwick Iron Company, Pottstown, has contracted with the Norris Iron Works for the building of a 500 horse steam engine, to be completed and in place by the first of June next.

The Iron Works at Sharpsburg are undergoing some repairs and improvements. The proprietors, Messrs. Lewis, Bailey, Dalzell & Co., are erecting a new sheet mill, and shortly intended to put in an engine to propel the sheet mill, so as to have it run independent of the other works.

NEW JERSEY.

R. D. Wood & Co.'s foundries, at Millville and Florence, have capacity for casting 25,000 tons of iron annually, and giving employment to 400 men. The pipes turned out range in size from 1½ inches to 50 inches in diameter, weighing from 25 pounds to 7500 pounds.

The American Saw Company, Trenton, manufacture all kinds of saws except hand saws. They have a saw in their machine shop, manufactured by themselves, which is said to be the largest circular saw in the world, being seven feet and four inches in diameter. The company employ, when running full time and force, 125 men, and do an annual business of \$300,000. They ship goods to all portions of the country, and also export their productions to Russia, Germany, &c.

MASSACHUSETTS.

Pattee & Perkins, Holyoke, have begun the manufacture of 200 Perkins hydrants.

Coughlan & Mullin, Holyoke, have begun work upon the new boilers for the Holyoke Lumber Company, and these, with two large ones which they are making for Hayden, Gere & Co.'s new works, will keep them busy until spring opens.

The Lowell Machine Shop has received a contract for mill machinery to the amount of \$275,000, which will require some time to fill. The Kitchin Machine Company, at the same place, are very busy making the well known cotton openers.

CONNECTICUT.

In a recent issue we described the Mammoth Vault, built by Duncan, Morris & Co., for the Duncan Safe Deposit Co., of San Francisco. The locks of this company, to the number of nearly 900 in all, were manufactured by the Yale Lock Co., of Stamford, Conn. Of these 400 were of a new pattern, devised with special references for use on safe deposit boxes. Each of the boxes of the Duncan Co. has affixed to the door a handsome metal number plate, designating the number of the box. These plates were also supplied by the Yale Lock Co., and are of a new and elegant design.

The Meriden Britannia Company have just refinished \$1000 worth of goods for the artist Thomas Nast, which he received from Pompeii and Herculaneum.

VERMONT.

A stock company has been formed at Felchville, for the manufacture of Wilson's clothes wringer, and they are now turning out a large number weekly.

The Fairbanks Company, of St. Johnsbury, have filled their contract to supply the United States government with scales for weighing newspapers under the new law.

The manufacture of iron continues at the Crown Point Iron Company furnace.

MAINE.

Two new cars (one smoking and one passenger) were recently placed on the track at Bath, by the Patten Car Works, for the St. Francis and Megantic International R. R. of Canada. They are of substantial build, nicely finished, and the cost of both is about \$7500.

NEW HAMPSHIRE.

The Ranlet Manufacturing Company, Laconia, have a contract for building four first-class passenger cars. The company are the largest manufacturing interest of Laconia, and have been nearly inactive for more than a year. They expect, however, to fully resume operations within two or three weeks.

The Granite Agricultural Works, Lebanon, destroyed by fire Nov. 13, 1874, have been rebuilt in a thorough manner, and on a much enlarged scale. The foundry is now 87x40 feet, iron roof, with rumber room, 32x22; machine shop, 40x120 feet, two stories; forge shop, 34x60, with drop presses, punches and shears for cutting stock complete; plow shop, 65x25, two stories and attic; engine house and boiler room, 31x30, brick and iron-proof. Exeter sectional boiler; Harrisburg steam engine, 50 horse-power. Fifty men are employed at present, with the prospect of soon increasing this force to nearly twice the number. Among the specialties manufactured here are the famous granite mowing and reaping machines, recently improved and perfected, also the celebrated reversible plows. Some three thousand of each of these agricultural implements will be turned out from this establishment, the coming year.

OHIO.

The Youngstown *Vindicator* says: "There is a strong probability that Brown, Bonnell & Co.'s Iron Works will resume operations soon, the puddlers agreeing to work at \$5 per ton."

The Niles Rolling Mill employs 175 men, with a monthly pay roll of \$8000. The works are running at their full capacity.

Steps are being taken to secure the location of a threshing machine manufactory at Seville. Say the *Ironton Journal*: "The Iron and Steel Co. are now making a great improvement in the sheet mill furnaces by which the company will save one half in fuel. This is a new improvement which has never been tried in this section."

Mr. P. P. Bush's Novelty Works, at Canton, are quite extensive. He has a good variety of machinery, consisting of lathes, planes, drills etc. The manufactures consist of stationary engines, mill work, mining machinery, shafting, gearing of all kinds, etc. Six engines made at this establishment are now in use in the city and vicinity, varying from fifteen to sixty horse-power. Mr. Bush has a novelty in engines in preparation; it is a small engine, less than six feet in length, of light power, especially adapted to printing presses. The works employ thirty men.

TENNESSEE.

The Chattanooga *Commercial* of Dec. 29, says: "The Chattanooga Iron Company yesterday received an order from Illinois for 400 tons of their mill iron. The purchasers, who are engaged in the manufacture of nails, accidentally got hold of some of the iron, and it suited their purpose so well they wanted more of it. Upon investigation, they found it came from Chattanooga, and hence this order. A lot of their foundry iron used for castings in Cleveland, the identity of which had been lost, was found to be of such excellent quality that it was traced back through the various purchasers the same way."

The English Company, at Smith's Cross Roads, near Chattanooga, are pushing their works to the utmost.

The Roane Iron Company's rail mill, Chattanooga, stopped recently for an indefinite time. It is understood that work will commence again after New Year's, and continue for eight months. It is also stated that the mill owners have a contract to deliver the iron for 100 miles of the Cincinnati Southern Railroad.

VIRGINIA.

The introduction of architectural castings, as a business, in Richmond, dates back to 1854. Bowers & Snyder, then engaged in the manufacture of stoves, undertook the cast-iron work for Bullard's Hotel, which at once brought them prominently before the public as experts in this department. The business grew so rapidly that the firm divided, Mr. Bowers opening a foundry for this class of work at another point in the city of Richmond, and Asa Snyder continuing the manufacture of stoves. After the war the two branches were again united, under the style of Snyder, Bowers & Co., and on the death of Mr. Bowers, under the firm of Snyder & Irby, as the Richmond Stove and Architectural Iron Works. On the 1st of January, 1874, Asa Snyder & Warner Moore, under the style of Asa Snyder & Co., decided to conduct this as a special business. They bought out the patterns of their predecessors. Their machine shop has five floors, each 60x150 feet, with a first-class foundry, affording facilities ample for 300 hands. They are working about 125 hands, and have in addition to their contract for the iron work for the Library of the new State Department, Washington, D. C., amounting to about \$60,000, an iron front for the splendid five story building corner of 9th and Main streets, Richmond, owned and to be occupied by the Piedmont and Arlington Life Insurance Company. They are just completing an elaborate iron front for S. P. Smith, president Farmer's Savings Bank, Charlotte, N. C. They are making a large amount of galvanized iron work, which has become an important branch of their business. Asa Snyder, the senior partner, deals largely in cold blast charcoal pig irons, representing twelve or more furnaces.

WEST VIRGINIA.

Quinnimont Furnace, Fayette county, on the line of the Cacapake and Ohio Railroad, was commenced about May, 1873. The furnace is owned and operated by the New River Car Company, and has a 60x15 feet stack, built of gray sandstone, and lined with Sciotoville (O.) brick. A road about one mile in length extends to the foot of the coal incline, where are the 60 coke ovens now in use. The furnace has been about two months in blast.

It is reported that there is a strong probability that iron works will be erected at Charleston. A meeting was recently held at that place, the object of which was to confer with parties from Pittsburgh, with that end in view. The locality has been examined by Mr. Bigley and Mr. E. C. Peeble, of the DuBarre Furnace Company, of Pittsburgh, who stated at the meeting that if the citizens of Charleston would raise \$50,000 of the stock necessary to build the works, they would erect two iron furnaces. He further said that \$30,000 was already subscribed, and when the full amount had been promised the work of construction would be immediately commenced. The offer is a good one, and it is thought the citizens of Charleston will furnish the requisite funds.

GEORGIA.

The Seaford Rolling Mills, at Atlanta, have just received an order for one thousand tons of steel capped rail for the Montgomery and Mobile Railroad, with assurance of another similar order provided satisfaction is given.

GEORGE GUEUTAL & SON,

39 West 4th St., New York.



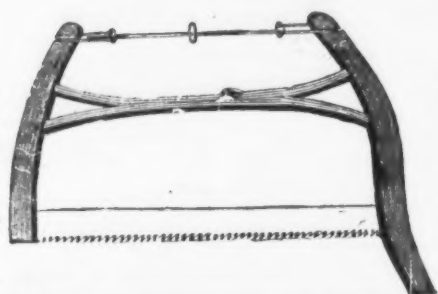
IMPORTER OF
Wood Screws, Steel in Sheets,
BAND SAWS, TOOLS FOR BRAZING, &c.
Bed Screws, Pin Hinges, and Wire Nails a Specialty.

H. W. PEACE,

MANUFACTURER OF

Saws of all kinds.

FACTORY, WILLIAMSBURG, N. Y.

**Elliptic Forked Saw Frame.**

Patented June 28th, 1870.

The annexed engraving represents my ELLIPTIC FORKED SAW FRAME, which commends itself to the trade for its simplicity of construction. The Forked Frame being all in one piece, without any center bolt, secures for the Frame great strength and durability. These Frames are put up with my best Webs, marked "No. 40, Harvey W. Peace."

HARVEY W. PEACE,
Sole Proprietor & Manufacturer,
VULCAN SAW WORKS,
WILLIAMSBURG, N. Y.

**THE SILVER STEEL
DIAMOND CROSS-CUT SAW.**

\$1.50 Per Foot.

Patent Secured

THIS new Saw, which is destined to take the place of all Cross-cut Saws in point of **SPEED AND EASE**, is manufactured by **E. C. ATKINS & CO., Indianapolis, Ind.**, who are the **SOLE MANUFACTURERS FOR THE UNITED STATES.** So confident are we that this is the best Cross-cut Saw in the market that we **CHALLENGE THE WORLD.** Orders promptly filled.
E. C. ATKINS & CO.
Saw Manufacturers and Repairers, Indianapolis, Ind.

**Lloyd, Supplee & Walton,
HARDWARE FACTORS.**

MANUFACTURERS OF

**Bonnev's Hollow
AUGERS.**

Stearn's Hollow Augers
and Saw Vises

Bonnev's Spoke Trimmers
Double Edge Spoke Shaves
Adjustable Gate Hinges
Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

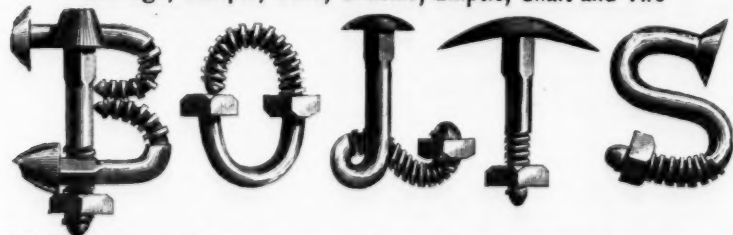
R. E. NEIL, President.

H. A. LANMAN, Treas. & Manager.

F. G. WADDELL, Secretary.

COLUMBUS BOLT WORKS,

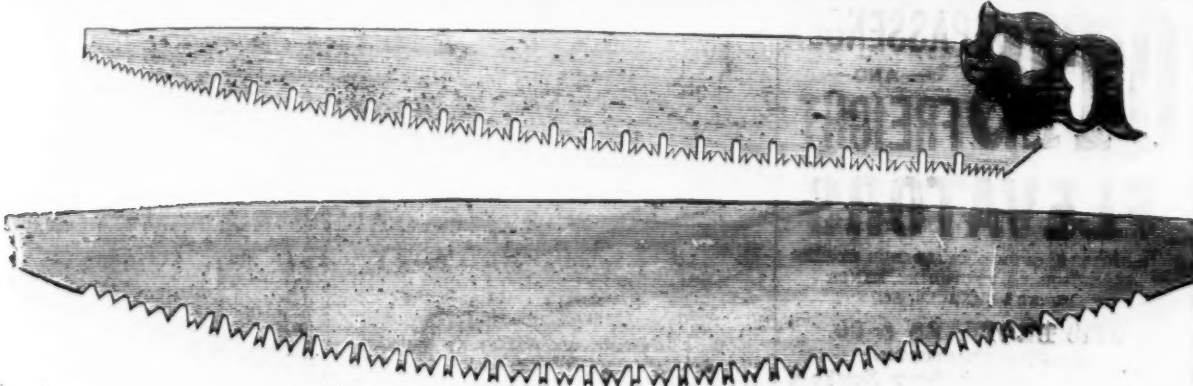
COLUMBUS, OHIO,

Manufacturers of **BEST NORWAY IRON**
Carriage, Steeple, Cone, Shackle, Elliptic, Shaft and Tire

All the different styles used by the manufacturers of the finest Carriages. Every Bolt warranted true to size and fit. Illustrated Price Lists mailed on application. Our facilities are unsurpassed for the manufacture of Machine Bolts and Coach Screws. Correspondence from Car, Bridge and Machinery Builders solicited.

J. FLINT & CO.,Manufacturers of all kinds of **SAWS** and **PLASTERING TROWELS**, Rochester, N. Y.

A large Stock of **Cross Cut Saws** constantly on hand. Orders filled promptly. **Dietrich's Double Handle One Man Cross Cut Saw** made with any kind of tooth desired. Our patent method of grinding Hand Saws makes them superior to any in the market. Send for illustrated Price List.

**E. M. Boynton,**80 Beekman Street,
NEW YORK,

Manufacturer of

**Saws of all kinds.
LIGHTNING SAWS.**

Also Sole Manufacturer of

Two Direct Cutting Edges, instead of one Scraping point.



Note extra steel and durability over the old V, outlined on the tooth.

I am willing and extremely anxious, on proper notice, to accept a Challenge from H. Disston & Sons, or any responsible Saw Manufacturer, and am ready to back my words with appropriate deeds and \$500 expense, if beaten.

N. B.—With Hand, Billet or Cross Cut Saw, \$500 on each.
E. M. BOYNTON.

Putnam's Government Standard
FORGED**HORSE SHOE NAILS.**Manufactured from the best of **NORWAY IRON**, and warranted to give entire satisfaction.

S. S. PUTNAM & CO.,
NEWPORT, WASH.

**First & Prybil's**461 to 467 W. 40th St.
New York City.Salesroom,
48 Cortlandt St., N. Y.**Patent Improved
BAND SAW MACHINES.**

For Bevel and Square Scroll Work and Re-sawing. Manufacture six different sizes. Prices, \$105, \$210, \$250, \$300, \$425, and \$1000. Also manufacture CARVING, SHAPING, FLUTING, ADJUSTABLE DOUBLE SPINDLE BORING, CARVED and SERPENTINE MOLDING MACHINES. Also, GENERAL and COUNTER-BALANCED OVAL TURNING LATHES for WOOD and BRASS TURNING, METAL SPINNING, etc. CIRCULAR SAW BENCHES, SHAFTING PULLEYS, and HANGERS. A large assortment of the best **FRENCH BAND SAW BLADES** at greatly reduced prices. And a Machine that will set an ordinary Band Saw PERFECT in two and a half to three minutes.

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ROUND BRAIDED
Belting.**

THE BEST THING OUT.

Manufactured only by

O. W. ARMY,

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**WHEELER, MADDEN
&
CLEMSON,**

Manufacturers of Warranted Cast Steel

SAWSof every description,
including

Circular, Shingle, Cross Cut,
Mill, Hand, Roberts' and
other Wood Saws,
&c., &c

Cast Steel Files

of the well known brand of

Wheeler, Madden & Clemson.

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BRANCH OFFICE:

97 Chambers Street, New York.

BRUNDAGE FORGED HORSE NAILS,

Manufactured from

BEST NORWAY IRON,
by **BRUNDAGE & CO.** Sold by
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Middletown, Orange Co., N. Y.

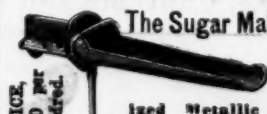


I make a specialty of the **LARGEST SIZES** of Circular Saws, and call particular attention of lumber manufacturers to the following points of excellence: **Evenness of Temper.** The peculiar structure of my turner subjects all parts of the saw to a **DEAD** heat, and when dipped in the oil bath secures perfect uniformity.

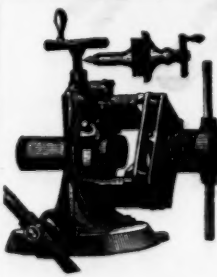
Perfect Accuracy in Thickness. My saws are ground on a patent machine, automatic in its operation, grinding off the thick places upon the plate before the thinner parts are reached, and when the saw is removed **BALANCES PERFECTLY**, which is proof positive of the right accomplishment of the work.

Properly Hammered. Great care is taken that no saw shall leave my works without due attention in this important particular. A saw too tightly strained upon the rim, or too loose in the center, cannot be successfully run—hence the importance of so hammering the saw as to effect equal strain in all its parts, and at the same time **RUN TRUE**. This department is under the personal supervision of myself, who has devoted over twenty years to the art of saw making.

I am sole proprietor and manufacturer of the celebrated "**Ohlen's**" Cross-Cut Saw. Price Lists of all kinds of saws sent on application.

JAMES OHLEN.**The Sugar Maker's Friend.**

More agents wanted to call your attention to the sale of **Peet's Patent** Metallic Eureka Saw. **Spoke and Shackle Hammer.** Samples, Circulars and Terms sent on receipt of 20cts to pay postage. Address, **C. C. Peet, Manufacturer & Patentee, Burlington, Vt.**

**PORTABLE PIPE AND BOLT
Threader and Cutter**

Cuts and threads from 1/2 inch to 3 inch Pipes and Bolts. Also taps Nuts and Casters work ready for Lathe. One man can thread 1/2 inch Pipe with ease with Die furnished with each Machine. No Pipe splitting, no pipe inside or out. Requires no skilled labor.

A Full Set of Sockets and Lengths for Making Nipples

Furnished with each Machine.

ANY SOLID DIE CAN BE USED IN THIS MACHINE.

Send for Circular.

EMPIRE MFG. CO., 18 William Street, N. Y.**E. E. YATES & CO., Hardware Specialties, 103 Chambers St., N. Y.**

No. 102.

No. 102, Braced Wood Saw (Red Jacket), \$10 00.

Also full line **BUTCHER & KITCHEN SAWS.**

Sole Agents:

JOHNSTOWN MFG. CO., Wood Saws, &c.; **RICK BROS.,** Butte, Brackets, Axle Pulleys, Grindstone Fixtures, Hay Fork Pulleys; **BUTTERFIELD & SONS,** all Saws; **HAWLEY & CO.,** Whistle Tree Hooks, Skains and Bores, &c.

LIST PRICES REDUCED.
No. 101, Brace Standard Saw, \$12 00
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VAN WART, SON & CO.Hardware Commission Merchants,
BIRMINGHAM, - ENGLAND,
Agents,**VAN WART & MCCOY,**

184 & 186 Duane Street, N. Y.

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49 India Street, Boston.**F. W. TILTON,**

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for **John Himmer & Son's Celebrated** Harness and other Needles.

Agents for **Seydel's "Ashantee" Pocket Hammer****OSCAR IRVING VAN WART & Co.,**

FORWARDING AGENTS.

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New York—Edward Frith, 16 Cliff Street,
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JOHN MAXHEIMER,

Patented,
June 3, 1873; April 6, 1869
Dec 23, 1873 Jan.
20, 1874.

Manufacturer of

—FULL SIZE OF—
WIRE CONNECTOR

JAPANNED and
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Bright Metal

BIRD CAGES.Nos. 247 & 249 Pearl Street
NEW YORK.**H. CARTER,**

280 PEARL ST., NEW YORK.



Manufacturers of and Dealers in all descriptions of Moulders' and Plasterers' Tools, and Dealers in General Hardware, Gilded Copper Weather Vanes, CARTERS' PATENT CARRIAGE LIFTING JACK, &c.

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Cutlery.

John Russell Cutlery Co.,

Factories and Office,

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Manufacturers of

TABLE CUTLERY,

Butcher, Painters' and Druggists' Knives

IN GREAT VARIETY.

Extra Hard Rubber Handle Table Cutlery of our own Manufacture.

Fine Ivoride Handle Table Cutlery, very White and Durable.

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NORTHAMPTON CUTLERY CO.,

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Cook, Butcher, Shoe and Hunting Knives. Sole Agents for Rogers' Cutlery Co. Plated Forks and Spoons. D. P. GRIFFITH, Manager, 45 Murray Street, N. Y.

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"ELECTRIC RAZORS."

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PETERS BROTHERS,

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LARGE STOCK OF

VIENNA 1873.

American, German, English

Pen, Pocket & Com-

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Scissors Scissor Cases

Razors, Hones, Straps, &c.,

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TABLE KNIVES AND FORKS OF ALL KINDS,

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And the "Patent Ivory" or Celluloid Knife. These Handles never get loose, are not affected by hot water, and are the most durable knives known. Always call for the Trade Mark "MERIDEN CUTLERY COMPANY" on the blade. Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers Street, New York.

THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of

PATENT FINE PEN & POCKET CUTLERY

WEST MERIDEN, CONN.

The only Knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting quality and workmanship to any made, and are acknowledged by English makers as the Best American Knife. We also make

NICKEL & SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory or by

J. CLARK WILSON & CO., 81 Beekman Street, N. Y.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing Chisels.

PLANE IRONS.

Gauges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awns, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

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Wood's Hot Water-Proof Table Cutlery.

Handsome, Cheapest, most Durable Cutlery in use. Wood's Celebrated Shoe Knives. Butcher Knives a specialty.

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Cutlery.



JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA,

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George Wostenholm & Son,

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Celebrated I-XL Cutlery, Razors, &c.

AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark.

NO SPENCER ROTHERHAM

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JOSEPH ELLIOT & SONS,

Manufacturers of Razors, Table Knives, &c.

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Joseph Rodgers & Sons

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

CHARLES PEACE, Jr., Agent.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers & Sons' Manufacture, please to see that they bear their Corporate Mark.

Notice of Removal.

ASLINE WARD,

From 54 Beekman St. to No. 101 and 103

Duane St., N. Y.

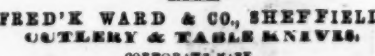
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GEO. WOSTENHOLM & SON

CUTLERY AND RAZORS,

WASHINGTON WORKS, SHEFFIELD.

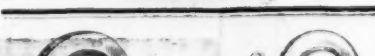
CORPORATE MARK.



FRED'K WARD & CO., SHEFFIELD,

CUTLERY & TABLE KNIVES.

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ROMER & CO.,

MANUFACTURERS OF

PAD LOCKS

NEWARK, N. J.

ESTABLISHED 1857.

Manufacturers of Patent Brass Pad Locks for

Railroads and Switches. Also, Patent Stationary R. R. Car Door Locks. Patent Plate

and Sewing Machine Locks. 141 to 145 Railroad Avenue, NEWARK, N. J.

Illustrated Catalogue sent on application.

Patented Steam and Hydraulic, April 1, 1868.

Of various sizes for ENGINE and PUMP, manufactured by JAMES CLANDIN & CO., No. 115 Queen St., Philadelphia. What the proprietors claim for the Eagle Packing is: 1. Its general adaptation to all purposes for which packing is used. 2. Its durability. It will outlast any other article in use. 3. Its cheapness. It can be furnished to the consumer at a lower rate than any other packing.

My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL at the Connecticut State Agricultural Society, also a Bronze and Diploma from the Mass. Mechanics' Ass'n Sept. 1867.

AMERICAN PEN AND POCKET KNIVES, MANUFACTURED BY

AARON BURKINSHAW, MASSACHUSETTS.

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PHILADELPHIA CORRESPONDENCE.

PHILADELPHIA, Jan. 11, 1875.

General satisfaction is expressed at the passage of the Sherman financial bill by the House. Not that it promises to effect what it claims to, or will bring about specie payments or inflate the currency on either hand, but that it is something definite for a year or eighteen months, and for at least that space business will have a chance to right itself. Of course, it will receive the executive approval, but owing to the intense excitement over the Louisiana question, the measure, which at any other time would have created endless discussion throughout the country, causes scarcely a ripple in even financial circles. With the signature of the President, perhaps, we may see some indication of its effect upon trade—just now it is simply neglected.

Probably the most interesting information lately received by consumers, and especially by the poorer classes, was the reduction of the price of coal in retail sales by the Philadelphia and Reading Coal and Iron Company. Hitherto at the opening of a strike, consumers have dreaded its prolongation as certain to enhance the price of fuel. New stocks being large, the company having, it is said, in their Philadelphia yards alone over a quarter of a million tons, the reduction is possible, and all the more acceptable since it is much needed. As to the prospect of the strike, that seems very uncertain, but as there are some 1,600,000 tons of coal above ground, a quantity sufficient for a four month's supply, it is stated, there is certainly a margin to go on. Relative to coal, a very interesting paper was read at the last meeting of the Historical Society, on the early discoveries of coal, "by Mr. Wm. J. Buck, from which I cannot resist quoting a few items of especial interest in view of the present magnitude of the industry.

Mr. Buck said, in introducing his theme, "that on arranging the Penn manuscripts, lately acquired by the Historical Society, his attention was arrested by a mention of a discovery of anthracite coal as early as 1766. A sample of the coal was sent to England, to be tested in reference to its adaptability to practical purposes.

"The public mind became excited on the report of a discovery of coal in Bucks county as early as 1763. From the hard, slaty appearance it presented in contrast with bituminous coal, the anthracite coal was considered for a long time to be stone. Under this impression a number of persons were arrested as impostors for selling it. The honor of discovering the great coal basin of Schuylkill county is said to be due to Colonel Thomas Potts, of Pottstown, at the close of the Revolutionary war.

"Reading Howell, in his map of Pennsylvania, published in 1792, marks the existence of coal near the source of Panther Creek, about five miles east of the present town of Tamaqua, thus showing a knowledge of its existence in that locality at that time.

"Philip Gunther, in 1791, discovered coal at Mauch Chunk, in the Lehigh region. The year 1820 is generally given as the commencement of the coal trade, when 365 tons were sent to market. The annual production at present averages 31,000,000 of tons."

Perhaps the most prominently interesting locumet of the year thus far has been Gov. Hartranft's message, which is not only important, but one of the ablest papers in the line of gubernatorial literature we have had for many years. Some of the points made are very forcible and upon subjects which are not only local but national interest. Among these the principal are the following:

Of industrial education the Governor claims that while attending to our common school system in a praiseworthy manner, our people have entirely neglected to avail themselves of the advantages of technical education. He justly claims that, while the great manufacturing State of the Union, we seek our skilled labor from other States or from Europe, and at our own youth to grow up to pursue foreign to their interests. He urges the adoption of technical schools, with lecture and draughting rooms, workshops and machinery, and that they be established at the principal cities, where all boys anxious to learn a mechanical trade, or to become mechanical engineers, may have free access; and sketches a plan by which this could be carried out at no great additional expense to the State. No subject possesses greater interest for the iron masters of Pennsylvania than this, and from every section of the State they should instruct their representatives to frame and adopt some such measure during this session of the legislature. In the same strain the message advises compulsory education as absolutely necessary. Of the Centennial, as is natural, the message is eloquent in advocating the utmost liberality on the part of our iron people as an example of patriotism. To the iron master the reference to the geological survey is especially interesting. The actual work of the survey began on September last, and the work has progressed very satisfactory since. A report will be published within a few weeks, which will embrace the examination of the iron ores and roofing slates of York, Adams, Lehigh and Northampton counties; the fossil iron ore belt of the Juniata Valley; the bituminous coal basins of Clearfield and Jefferson counties, and the oil regions of Venango county, with descriptions of other minerals, analysis of ores, coals, clays and rocks, and illustrated with carefully prepared maps. This is certainly a showing for four months' work on the limited appropriation of \$35,000, which reflects the very highest credit upon the very thorough and practical geologist at the head of the survey, Prof. J. E. Leakey. Fortunately for the Centennial, the Mineralogical Museum, to be collected during this survey and located at Harrisburg, will be exhibited here during the exhibition. One more point in the message is very important, and this is the reference to the necessity of some measures to arrest the destruction of our forests. Of this the Governor assures us that lumber men of experience state "that with the present progress of destruction in 30 years Pennsylvania will not have any valuable timber within her border." He also points out the climatic changes which follow the denudation of the soil from timber, and urges the appointment of a commission to frame the proper measures to be adopted.

The gospel of the week is considerable, but I have outrun my space. The Pennsylvania Railroad Company has negotiated a loan of \$15,000,

000 in Europe, at 91 per cent. gold. Your dry goods king, A. T. Stewart, has patriotically subscribed \$10,000 to the Centennial, thereby showing his usual foresight. The Trustee of the Jay Cooke estate offers in settlement 5 per cent. cash, and the rest in bonds of mixed character and value.

The Puddlers' Strike at Troy, N. Y.

We take the following from the Troy *Whig* of the 12th instant:

At 3 o'clock yesterday afternoon about 40 men—puddlers and other laborers—arrived in this city in a body from New York to work in the Messrs. Burden's steam mill. Preparations have been made for boarding and lodging the men at the works, where ample protection will be afforded. It has been so arranged that it will not be necessary for them to go off the grounds belonging to the Burdens; so they will not be liable to the least molestation. Fifteen or twenty furnaces will be started to-day. In the present state of the labor market no difficulty was experienced in securing skilled laborers.

Burden's water mill is in full operation with the exception of the puddling forge.

The Police Commissioners yesterday appointed fifty special policemen for Messrs. Burdens and thirty for Corning & Co. They were sworn in by the Mayor yesterday afternoon, and are now on duty. In addition to this a detail of twelve of the city police will be on duty at Messrs. Burden's works. The following are the officers detailed:

First Precinct.—Sweeney, O'Brien, Coughlin and Maher.

Second Precinct.—McChesney, O'Day, Hoar and Murray.

Third Precinct.—Russell, Faist, Manning and Ham.

The men will go on duty at 7 o'clock this morning. We sincerely trust that whatever differences may exist in these works, as between employers and workmen, will not lead to any evidences of bad feeling in the way of violence. These men, like all persons in this world, are entitled to individual opinions and prejudices, but have too much respect for themselves and the good government of society and community to engage in acts which would render the employment of extra guards upon life and property necessary.

A MANIFESTO TO THE PUDDLERS.

The following communication has been sent to one of the representative puddlers of Troy:

PHILADELPHIA, Jan. 7, 1874.

Mr. —

DEAR SIR AND BROTHER: I deem it my duty to inform you that there has been an advertisement in the Philadelphia *Ledger* for the past week for non-union puddlers outside of this city. Some of our boys made application in order to ascertain where those non-union men were wanted, and who needed their assistance. They were told by the agent, J. W. Corson (such was the name given) that they were wanted for Troy, and the terms were as follows: Three dollars per day and four dollars per ton; this arrangement to last until the Troy men should succumb; the three dollars per day to be paid over and above what they could make at the four dollars per ton; lodging provided in the mill, and board also; no need of going outside, and all are to be protected by an armed body of men numbering one hundred and fifty. When the strike is over if the sheep want to return to their homes they will be furnished a free pass, and none of the Troy men will get a chance to see them.

Therefore, we were not surprised when those distinguished visitors arrived at the iron works yesterday. What seems strange to us iron workers of Troy, is that those iron masters can afford to pay such high wages in these dull times, no demand for iron, &c., &c. We now ask and request our brother iron workers of Troy to act in the future as they have done in the past—keep the peace. Do not allow yourselves to be shown up as a parcel of rowdies. Show the citizens of Troy and the country at large that you are law-abiding citizens, and do not countenance violence under any circumstances. You are asking nothing but your rights, and right will eventually triumph.

UNITED SONS OF VULCAN.

The Invention of the Hot Blast.

To the Editor of The Iron Age:—DEAR SIR: I see by an article in your paper of Dec. 10 that Dr. Frederick W. Gelsenheimer, of Schuylkill county, Penn., is credited with having invented and first introduced the hot blast. Allow me to state that the hot blast was introduced in Wales as early as the year 1825, and in 1829 was successfully introduced at the Varteg Iron Works, Monmouthshire, South Wales, where I served my time as an apprentice and worked on patterns for the hot blast apparatus. The pipes at that time were oval, and measured inside 6x15 inches. They were laid in two rows the length of the oven at an angle of 45°. There were 12 in number, passing through the oven between the blowing engine and tuyes. The construction of the ovens, and the arrangement of the pipes, etc., was under the direction and management of Mr. Kenricks, one of the proprietors of the works. He told my father and me that he had tried the heating process at his hollowware foundry, in Staffordshire, England, and stated to us at that time that previous to its introduction at his foundry, he had to use the very best No. 1 foundry pig, whereas he was then using only a good bright iron with equal success.

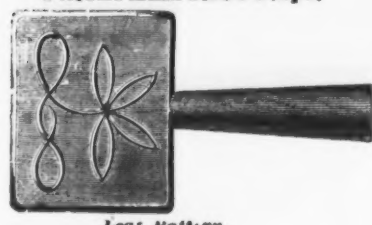
The hot blast was used in two other works—in Scotland and in North Wales—before being introduced in the Varteg. Yours, respectfully,

T. W. JONES.

The increased use of steel rails threatens to destroy the iron rail production of the north of England, and the present idleness and consequent distress to labor there are largely attributed to this.

H. D. SMITH & CO., PLANTSVILLE, CONN.

Patent Embossed Steps.



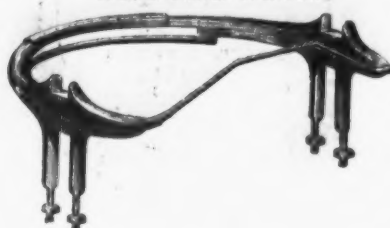
Leaf Pattern.

King Bolt Yokes.



Established 1850.

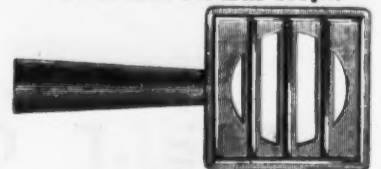
No. 6 Fifth Wheels.



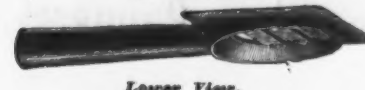
1871 Pattern Shaft Couplings.



Patent Cross Bar Steps.

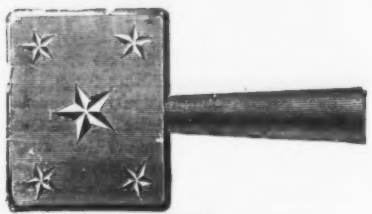
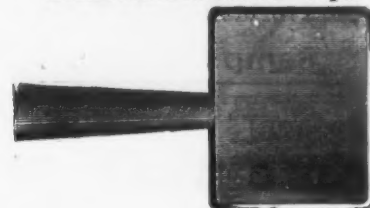


Upper View.



Lower View.

Solid Plain Pattern Steps.



Star Pattern.

Smith's Improved Philadelphia Pattern Slat Irons.



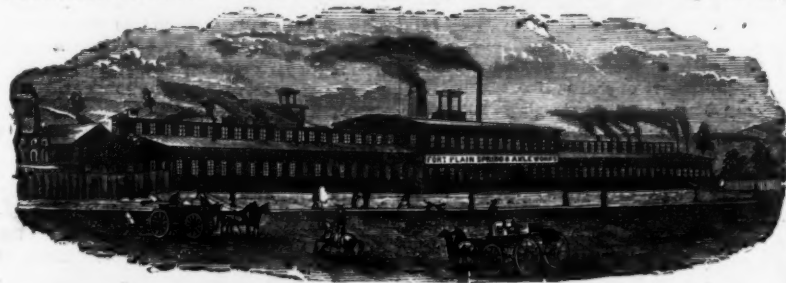
MANUFACTURERS OF A LARGE VARIETY OF FIRST-CLASS

FORGED CARRIAGE IRONS.

Send for Price List.

FORT PLAIN SPRING & AXLE WORKS, CLARK, SMITH & CO.,

Green Jacket Axles. FORT PLAIN, N. Y. Fine Carriage Springs.



MANUFACTURERS OF

English and Swedes Steel Springs, and Iron and Steel Axles.

Execute orders promptly for

Black, Bright, Tempered and Oil Tempered Springs,
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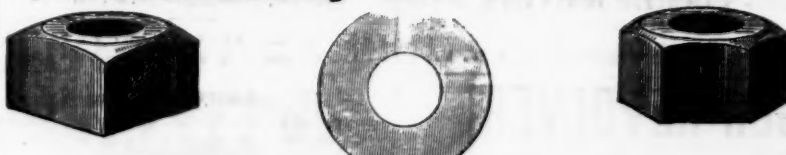
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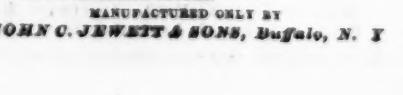
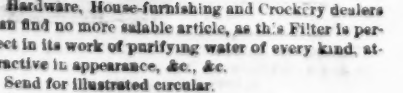
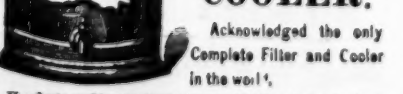
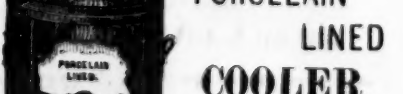
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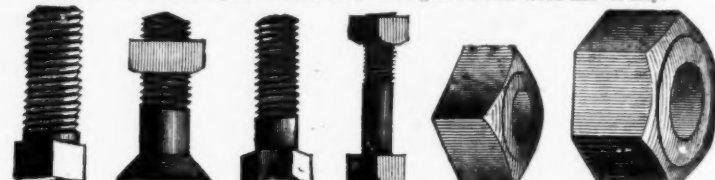
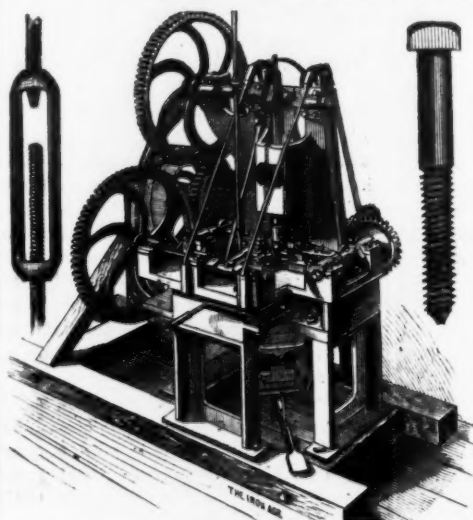
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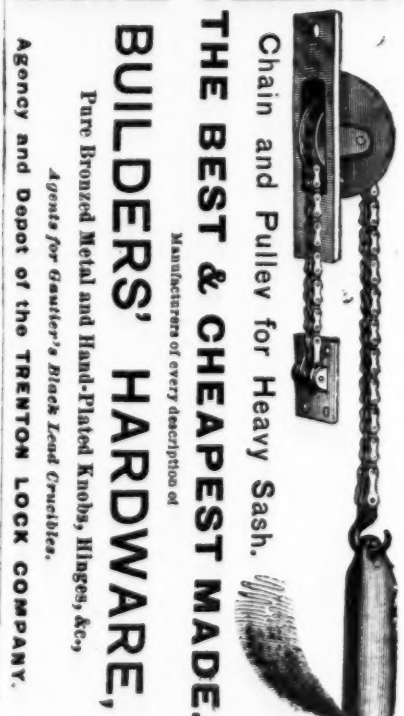
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The Iron Age.

New York, Thursday, January 14, 1875.

DAVID WILLIAMS - Publisher and Proprietor.
JAMES C. BAYLES - Editor.
JOHN S. KING - Business Manager.

New York, January 2, 1875.

Until the 1st instant this postage on newspapers was paid by subscribers at the office where the paper was received, the yearly rates on the different editions of *The Iron Age* being as follows: Weekly, 40 cents; Semi-Monthly, 80 cents; Monthly, 24 cents. Under the provisions of the new postal law, which went into effect on the 1st instant, prepayment at the office of mailing is required, at the rate of two cents per pound for the Weekly, and three cents per pound for the Semi-Monthly and Monthly, which will make the postage as follows on the different editions: Weekly, 50 cents; Semi-Monthly, 90 cents; Monthly, 15 cents.

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City Subscribers will confer a favor upon the Publisher, by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*; also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers only to persons authorized to receive them, and not to throw them in hall ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

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Recent Additions to the National Wealth.

It is a cause for congratulation that the closing months of the most unprofitable business year of the last quarter of a century have been rendered memorable by two of the most important mineral discoveries ever made in the United States. In the late developments, by deep mining in each instance, of the immense masses of anthracite coal at the Norwegian shaft of the Philadelphia and Reading Coal and Iron Company, near Pottsville, Pennsylvania, and of the wonderful deposits of silver ore in the Comstock lode in Nevada, both the industry and wealth of the United States, have received additions, the future effect of which it would be difficult to calculate. Almost simultaneously upon both sides of the Continent intelligent engineers have proven their theories and calculations to be true in exploitations which, in all probability, will add within a very few years

hundreds of millions of dollars to the wealth of the country, and give a new impetus to trade and manufactures at a period when such stimulus is sorely needed. It may at first sight seem somewhat incongruous to compare a discovery of coal to that of silver ore, but in this case the magnitude of each, and the great future importance of both to the country, render them fit subjects of comparison. The facts in the two cases are already tolerably familiar to the public and need be but briefly stated here. In reference to the discovery of anthracite coal in Pennsylvania the history is as follows:

For some years the opinion has existed among mining engineers that any anthracite veins at a great depth would be of little commercial value, if found. Others, among whom was the chief engineer of the Philadelphia and Reading Coal and Iron Company, Gen. Henry Pleasants, held to the contrary, and claimed that at a depth of some 1500 feet the several veins which geologically belonged in that position would be found workable. In pursuance of this belief, the company sank a shaft to a depth of nearly 1200 feet, when, finding the formation becoming broken, further mining was stopped, and a drill hole, for the purpose of testing, was sunk 850 feet further. It is not our purpose to describe the position and peculiarities, some of which were very unusual, under which the various veins of the region were found. Suffice it that the result bore out the views of the engineer, and that at a depth of 1900 feet, after passing through the overlying deposits of coal, slate and blackband ore, the upper member of the Mammoth vein was struck, the coal being of excellent quality. Practically, the result to be attained by this discovery is an addition to our anthracite supply of at least 50,000,000 tons by the most careful estimates, and ultimately the possibility of developing from this depth the entire sequence of veins for a distance of a mile or more, and to a depth of 3000 feet, thus adding other millions of tons to the possible product, the amount of which it is idle at present to compute. The benefit to be derived by the industry which develops, the transportation company which carries, and the manufactures which in future shall consume this immense mass of fuel, can only be estimated; to compute them would require the ability to fix the absolute progress of the nation for at least the coming century. Above all, however, is to be reckoned the certainty of the existence of vast deposits of fuel hitherto unknown.

While the labor was progressing in Pennsylvania which was to bring to light this important future supply of anthracite, another engineer in Nevada, Mr. Deidesheimer, a graduate of Freiberg, and of great experience in mining in the celebrated Comstock silver lode, announced the theory that at or about the 1500 foot level of the Consolidated Virginia mine, the Ophir or the California mines, would be found greater argentiferous wealth than had yet been discovered in the world, and that it was presumable it would extend for a very considerable distance. Not only have his calculations proven true by subsequent developments, but the character of the ore discovered is entirely different from the usual product of the Comstock, while in value it equals the richest and, unfortunately, limited discoveries of other portions of the State of Nevada. The extent of this vast deposit of valuable mineral can only be determined by future exploitation, but since its discovery sufficient development has been made to trace it through the ground of all of the mines named, and to place its value, as at present known, at over \$1,000,000,000. Stupendous as the figures sound, it is to be remembered that they are the calculations of some of the best mining engineers of the world, joined to those of certainly the shrewdest business men of the Continent. As evidence of the truth of these statements, all mining talent joins in the acknowledgment that the Comstock "find" of 1874 surpasses in value any previously made in the world, even the famed mines of Peru and Mexico. Already, under the influence of actual development, the value of the mines in which this "bonanza" has been found, through one of which runs the boundary line between California and Nevada, has increased since December 1, 1874, at the rate of over \$1,000,000 per day. How much of this is due to speculative excitement, always attendant upon such discoveries, and how much to actual mineral wealth, remains to be shown, but when it is considered that those investing are the shrewdest operators in the country, some credence may be given to the possibilities before us from this discovery. The Comstock lode has alternately enriched and impoverished a great many people. That it will, under the speculative mania, engendered by the acquisition of sudden wealth, similarly injure many more, is probable. The effect upon the individual is not, however, to be

here taken into account. That of the addition to the wealth of the nation and to the bullion supply of the world is now the problem before us. The effect of the first discovery of gold in California is well known. Industry in all branches of trade, commerce and manufactures was stimulated; a period of comparative idleness and dullness was changed to one of activity and enterprise. Later, a prosperous agricultural and manufacturing community was created, and the arts and amenities of civilized life established, where previously a barbarous and nomadic handful of men had obtained a living from their herds. Still later from it grew the greatest engineering triumph of its day—the Pacific Railway. With this came the introduction of trade into Japan, the creation of new steamship lines, a demand for American products, and an addition to the total wealth of the country which can by no means be compared to the actual production of precious metals on the Pacific coast. No such discoveries of minerals, whether of fuels, the source of all industry, or of ores of the useful metals, or of the more precious metals, as have here been noted, have ever been made without being immediately followed by a marked and rapid increase in the material prosperity of the country in which they have occurred. As in the case of the discoveries of Gen. Pleasants in Pennsylvania, the existence of such a mass of coal will afford labor to thousands, increase iron production, enforce greater transportation facilities, create a demand for more ships, whether of iron or wood, and with all these to steadily increase the material prosperity and happiness of the people through whom this is to be done. So in Nevada will this, the greatest argentiferous discovery of history, produce like results. The existence of wealth at a given point only serves to stimulate the search for it at others. The development of the first creates a demand for agricultural and manufactured products, which, if not surpassed, are generally equalled by those of later occurrence. The whole section of the country becomes the scene of enterprise and industry, which is reflected upon more settled regions. The time of these discoveries is opportune. The country has languished for over a year in unwanted dullness; a stimulus was required, and no better stimulus can be administered than one which will induce immigration, create a demand for manufactures and revive commerce. In view of the probabilities of the near future from the two accomplishments our iron masters would do well to consider how best and how surest the iron industry may obtain its share of the improvement likely to come within its reach.

The Situation in Pittsburgh.

Private advices from Pittsburgh inform us that the trouble between the manufacturers and the puddlers, which began, as our readers know, in a question of wages, is now beginning to assume a much more important aspect. It is fast becoming what has not been seen in Pittsburgh for several years, a contest between the employers and the union, and as such it possesses a national interest. As we have said, the iron masters of Western Pennsylvania have had but little experience of this kind of trouble. They have, as the rule, carefully avoided it, believing that their interests would best be served by adopting a conciliatory policy toward the union. They have even expressed themselves as decidedly favorable to it, and this at times when manufacturers in other districts were struggling at great disadvantage to decide the question whether they, or some one representing their men, should control in matters connected with the management of their business. Possibly this course has saved them some trouble in times past, but they are now in a position to see that, after all, the union is not so desirable an institution as they once professed to believe, and we know that in some instances, if not in all, men now on strike would not be taken back again, even at lower wages, until they had first severed their connection with the unions now controlling their actions. We do not know that all the manufacturers whose men are now on strike, agree upon this point, but that is undoubtedly the aspect which the contest is assuming. We are glad of this. No compromise or temporary adjustment of the wages question would be permanently satisfactory if the power of the union is to remain unbroken. Western Pennsylvania is the stronghold of the various iron trade unions, and especially that representing the puddlers. A square issue between masters and men at this time must materially strengthen or materially weaken the power of these unions for mischief, and if the masters are firm and determined, as they now seem likely to be, they will decide for the whole country many important questions

affecting vitally the interests of the iron trade. They know, far better than we can tell them, what they have to gain or lose in the fight in which they are now engaged. They know, or may know, that to surrender to the union upon any terms, now or six months hence, means trouble for years to come, and their only safety for the future is to defeat the union and weaken its power; and they have learned from recent experience that upon such a course depends not only their own prosperity, but the protection of life and property from wanton outrage. Within the part few weeks no man's life has been safe for an hour who ventured to work at a puddling furnace, and the few thousand desperate and determined men who will not work themselves, except upon their own terms, have kept a community in idleness, entailing suffering and privation upon a great number of people. The trade union is a monster without a heart, and it would seem, without instinct, much less reasoning powers. It cares for nothing, so long as a point sought is gained by fair means or foul. If the iron masters of Pittsburgh have taken this monster by the throat at last, let them, not loosen their hold until they have strangled it.

We speak plainly on this subject, but not more strongly than the facts warrant. The power of the trade unions has become a perpetual menace to the prosperity of the iron trade. In many parts of the country labor has for years past virtually controlled the capital invested in iron manufacturing plant. Irresponsible committees have dictated terms and laid down rules to which masters have had to conform. They have decided the market price of labor, have said who should and who should not be employed, and have extended or restricted the privilege of employers to do what they will with their own, according to the judgment of certain cheap demagogues whose living depends upon keeping up a perpetual agitation and fomenting a perpetual strife. Under this tyranny masters and men have suffered more or less patiently for years. In the meantime, the unions have perfected their organizations, gained strength and influence, filled their treasuries, and emboldened by past success, become doubly insolent and dangerous. We have tolerated them long enough, and every interest, public and private, demands that the power of the unions should be broken, and the workingmen emancipated from the pernicious and debasing servitude which it imposes—at least to an extent which will leave them free to act according to their judgment in all matters affecting their individual interests. The present time is the most favorable for the suppression of the unions that is likely to present itself for many years, and Pittsburgh has become the field upon which the decisive battle is to be fought. We hope the iron manufacturers fully appreciate the gravity of the responsibility which rests upon them, that they will give the men plainly to understand that the partitions of the unions will not be taken back upon any terms, that they will sustain each other until the issue is decided, and that employers in all parts of the country will extend to them the moral support to which, in this instance, they are fairly entitled.

Technical Education.

The message of Gov. Hartranft to the Pennsylvania Legislature, a copy of which reached us just after our issue of last week had gone to press, contains a recommendation on the subject of technical education which we should have been glad to have published with our own remarks on that subject. Gov. Hartranft says:

The report of the Superintendent of Common Schools, wherein the statistics of our educational system are presented with unusual care, will enlist the profound study of those interested in the mental and moral training of our youths. Convincing as these details are of the close relationship existing between education and the true welfare of the State, our people are still slow to adopt methods used in other countries and States, whereby the boundaries of instruction are extended and knowledge imparted of a more useful and practical kind. Our common school system is now fixed upon a firm basis, and a free education assured to all who wish to avail themselves of its benefits, and inquiry should, therefore, be directed to the discovery of the best plan to fit our children for the numerous vocations that are the outgrowth of the peculiar resources and varied industries of the State. Upon a survey of the agencies used in unfolding these resources of Pennsylvania, it must be confessed the mechanical work necessary for their proper development requires labor of the highest skill; and if this survey extends over the vast and complex system of her industries, how manifold are the places where practical knowledge and handicraft are needed.

It is to our mineral wealth and manufactures we mainly owe our riches, power and the advantages we possess as a State; and in our mines, furnaces, forges, rolling mills, locomotive works, and the myriads of factories, wherein her products are formed for use, trained hands and minds are always wanted. Can they be found among our own people? Reasonable and just complaint is made of the want of skilled labor in our midst, and the constant recourse had to foreign countries to supply this pressing need. In our great iron and other industries, and wherever skilled labor is required, the greatest number of those employed have acquired their experience in Europe, or the Eastern States. Is it not time

for Pennsylvania to absolve herself from this dependence, that imposes upon many of her sons the condition of common laborers, at the bidding of overseers from without the State?

In the future that awaits our great State, with her exhaustless wealth, wherein are all the elements of empire, shall her children be the hewers of wood and the drawers of water, or shall they assume the position to which their birthright entitles them and direct and control her destiny? A very small number of our boys become artisans, and yet it is a maxim of political economy that the measure of a State's productivity is in proportion to the skill of its labor. We disburse in this Commonwealth ten millions of dollars annually to educate our children, and no one doubts the wisdom, policy or necessity of this expenditure; and of the children who complete their terms at her schools not one has any special fitness for a trade or any acquisitions that will enable them to compete successfully with the skilled labor engaged, in many instances at high prices, in extracting our mineral stores or in the conduct of the great industries that are the pride and chief support of the State.

I am persuaded the members of the present Legislature are interested in any design that concerns the honor and welfare of the State, and I appeal to your judgment whether the dictates of common sense and proper appreciation of the true sources of our prosperity do not demand that some provision should be made for training a portion of our children in a knowledge of the mechanic arts; and I beg leave to offer a few suggestions as the outlines of a plan to impart this knowledge, which, upon examination, I believe to be feasible and applicable to our system of education. Let your men in our common schools who desire to become mechanical engineers or master mechanics, or acquire a knowledge of some particular branch of mechanical industry, be transferred to schools where they can be taught the sciences that bear upon, and especially mathematics in the relations to the trade they wish to learn. Lecture and drafting rooms should be provided and a workshop furnished with all the improved machinery, the former to be presided over by a professor of mechanical engineering, and the latter carefully supervised by a master mechanic.

The time of the students could be divided between the school-room and the workshop, and the lessons taught in the one be reduced to practice in the other, and a knowledge obtained of the mechanical processes made use of from the simplest to the most complicated work. Is there any practical obstacle to educating boys in this manner so that they can calculate the size and parts of a machine, then draught and finally make it with their own hands, if required; in Philadelphia, Pittsburgh and other large manufacturing cities, where the means of acquiring information of this kind are so ample, schools such as I have described might be established without great cost, and where provision is made therefor by the local school boards the State should be pledged to give them proper assistance.

The subject presented thus briefly and forcibly is one which merits and should receive the prompt and intelligent attention of the Legislature. So far as we know, no State has yet undertaken the work of providing facilities for industrial and technical education on a scale calculated to place such facilities within the reach of the great mass of those who would be most benefited. Institutions like the Cornell University, the several agricultural colleges throughout the country, and the few good polytechnic schools in different States, are doing an excellent work in their way, but they are of little benefit to the great mass of boys and young men in our cities apprenticed to the various mechanical trades, which few of them will learn thoroughly in workshop and factory. We need free schools, with day and evening classes, in all our large cities and industrial centers, where those who will may acquire a knowledge of mathematics, the applied sciences and drawing, under a system which shall so classify the studies as to enable each to learn, in the least time, that which is most immediately useful to him in the trade he follows or proposes to follow. Polytechnic schools, in which students could follow a complete course of study extending through three or five years, will naturally grow out of such a system, and we can wait for their establishment until their importance shall be understood and appreciated by the public. The great State of Pennsylvania, which depends for present and future prosperity so much upon the intelligence and skill of her mechanics and miners, should set the example in this matter, in compliance with the excellent suggestion of Gov. Hartranft.

Fires from Defective Flues.

One of the most frequent and dangerous causes of conflagration in dwelling houses during the winter season, is the close contact of timbers to concealed furnace flues. Every year we have this subject brought prominently to the public notice by the destruction of much valuable property, and not infrequently the loss of life, and yet builders do not seem to observe the necessary precautions, and householders are, apparently, as indifferent as ever to a danger which is all the more to be dreaded because unseen. Fires attributed to "defective flues" are more often attributable to the defective setting of flues, resulting from ignorance or carelessness on the part of builders and contractors. A careful investigation would generally show that there was no defect in the flue proper, but that they were placed in close proximity to well seasoned wood work. As the rule, the furnaces put in city houses are too small. They answer very well in moderate weather, but in very cold weather they have to be driven beyond their proper capacity, the flues connecting with the registers become overheated, timbers previously charred

take fire, the danger is not discovered until too late, and before the point of ignition can be reached by a stream of water the fire may have gained so much headway as to be beyond control. We know of one large building, destroyed not long ago by fire, in which the hot air was conveyed to the registers from the furnace in pine boxes lined with tin. In this case the plea of a "defective flue" was well founded.

In all buildings particular care should be taken to have an open space between the flues or pipes, by which hot air is conducted, and the woodwork, and were this precaution always observed fires originating with the flues would be of rare occurrence. The experience of fire insurance agents, and others whose business it is to investigate the causes of fires, goes to show that in many instances they arise from the fact that the beams which support the flooring are made to rest either directly in the brick work of the flue, or close against it. The use of a trimmer beam, by which this could be avoided, entails a little extra expense, and many of those who build houses by contract, or on speculation, unless specially watched, will not use it. After the house is completed, and all the work on it closed in, it is hardly possible for the insurance inspector to tell whether this condition of safety has been complied with or not, and hence many houses are judged to be safe that are really dangerous. It is manifest that wood-work in such close contact with hot air flues will, in a short time, become as dry as tinder, and liable at any moment to ignite, and the great danger to those who occupy dwellings built in this way consists in their ignorance of what is always impending over them. Fires sometimes occur from breaks in hot air pipes, produced either by rust or other cause, and a frequent and careful inspection of their condition should be made. Steam pipes, also, have been occasionally the cause of fire by being in too close contact with the wood work of buildings, although instances of this kind are of rare occurrence. Some years ago a fire in a Broadway building was traced directly to the action of a steam pipe, producing such a state of dryness in the partition to which it was attached as to cause it to ignite. In very many cases fires do their work so thoroughly as to destroy all evidence of the condition of the flues and heating apparatus, and may be sometimes attributed to the defects there which did not exist, but it is beyond doubt that a large proportion of those that occur, especially in dwelling houses, arise from the culpable negligence of the builder in not adopting the proper methods of prevention.

There are no such difficulties connected with this matter as are involved in the proper method of ventilation; the conditions of safety are well known to builders, and when fires occur from their neglect of the proper precautions, there ought to be some means of bringing home the responsibility in such a way as would compel their observance of more careful methods of construction. The ordinary furnaces, steam heaters and stoves used in our dwellings, are not necessarily dangerous, if sufficient space is allowed between the pipes and the woodwork to permit the free circulation of air, and fires which occur from the neglect of this simple precaution can only be the result of a gross neglect of duty on the part of those who could prevent them if they would.

How to Determine the Value of an Iron Ore.

BY EDWARD J. HALL, JR., BLAST FURNACE ENGINEER.

The main reason why practical men value scientific investigations and chemical knowledge so little is because they are so often rendered unintelligible to people of ordinary education. Ideas which would gladly be utilized, if understood, are obscure and vague because expressed in mathematical formulae or chemical symbols. In no subject relating to the manufacture of pig iron does science bear a more important part than in determining the positive and comparative values of ores—in no subject must science be more carefully supplemented by thorough practical knowledge and business experience.

As the time is approaching when contracts for another year's supply are to be made, it will be profitable to give some very serious consideration to the elements which control values.

To make the discussion clear and practical, I will assume that the selection of ores rests with a manager of excellent judgment and business experience, but with little chemical knowledge or acquaintance with the details of furnace work; he controls an anthracite furnace designed to make foundry iron.

Coal costs \$6 per gross ton; limestone \$1.50 per ton. The ores used are: No. 1, at \$70; No. 2, at \$7; and No. 3 is offered at \$3.50. (See analyses below) as a substitute for No. 2. How shall he decide whether a change would be profitable? His foundryman's advice probably is the safe maxim to "let well enough alone," but this may not be the most economical, for foundrymen are very often controlled by tradition or prejudice, and they generally dis-

like innovations of any kind, although there are to this rare and valuable exceptions. A chemist, unless a practical metallurgist, does not always give counsel to be implicitly followed.

It is much better that the manager should possess such a knowledge of the elements involved, that, after obtaining the advice of the chemist and foundryman, he is prepared to form a correct decision himself. The first step is to procure a reliable analysis. If I did not know in how many cases this fundamental necessity is overlooked entirely, or its importance totally underestimated, I should consider it so obviously required as to need no mention. Of course the ore dealer shows an analysis, generally made by some well-known and responsible chemist, but unless he will guarantee to deliver no ore below the standard of his selling analysis, it is better to obtain one (not from samples furnished by him) but selected, if possible, by your chemist or under his directions. Suppose the ores in question to analyze as follows:

	No. 1.	No. 2.	No. 3.
Silica.....	6.104	18.800	13.108
Alumina.....	0.099	0.604	2.005
Lime.....	none	none	7.308
Magnesia.....	none	none	1.980
Sulphuric acid.....	none	0.039	0.268
Phosphoric acid.....	0.257	none	none
Peroxide of iron.....	93.000	80.000	68.572
Carbonic acid and waste.....	0.240	0.405	0.760
Total.....	99.700	99.908	100.001
Metallic iron.....	63.1	57.4	48.0
Yield in the furnace.....	63.1 (about 54)	57.4 (d)	48.0

The first point to be determined is whether the ore contains any injurious substances in amounts sufficient to render it worthless for its intended use.

The most important impurities and their effects are briefly as follows: Phosphorus renders iron cold short; a very little diminishes very materially the value of mill iron, but in foundry iron for making fine and delicate castings quite a large proportion may be a positive advantage, as its presence renders the iron much more fluid. The amount of this, and of all the other impurities permissible, depends on the purposes for which the iron is designed, and must be determined in each case. Sulphur in very small quantities makes iron red short, but while all the phosphorus in an ore goes into the iron, a large proportion of the sulphur passes off in other ways. A little sulphur in foundry iron increases its hardness, and its presence in the ore is said to increase the production of white iron. Manganese, in quantities less than one per cent., does not injure foundry iron—more renders it hard and crystalline; ore containing it is valuable for the production of Bessemer steel. Chromium makes iron hard and brittle, but is considered a valuable ingredient in steel for some purposes. Titanium in small proportions increases the strength of foundry iron; it is probably all removed in the puddling process. Zinc is volatile, and does not get into the manufactured iron; it is found in large quantities in some New Jersey ores used for the manufacture of spiegeleisen. Lead and copper produce red shortness. Tin, arsenic and antimony are rare; their effect is to make iron hard and cold short. Silica, alumina, lime and magnesia will be considered farther on.

The ores under investigation contain none of the impurities spoken of except phosphorus and sulphur. No. 1 contains 0.257 per cent. of phosphoric acid, and is a little cold short. No. 2 contains 0.039 per cent. of sulphuric acid, and No. 3 0.268 per cent. of the same substance, hence both are red short, and so far as any injurious effects are concerned, may replace each other.

The second point to be determined is the comparative producing value. This depends on the cost of ore, coal, flux and labor required to produce a ton of iron from each. No. 1 yields 63 per cent., so 2340, divided by 0.63, will be the number of pounds of ore required to produce a gross ton of iron; 2340 divided by 0.63 equals 3556; 3556 pounds of ore at \$10 per ton cost \$35.56.

No. 2 yields 57.4 per cent., so that it requires, per ton of iron, 4148 pounds, costing, at \$7 per ton, \$29.07.

No. 3, estimated at 48 per cent., will take 4978 pounds of ore, costing at \$3.50 per ton, \$17.32. The amount and cost of coal required per ton of iron, of course, vary with the constitution of the ores, construction of the furnace, management, &c.; it should always be calculated from what has actually been done on an entire average blast. Supposing the construction, management and fuel to be good, No. 1 will require about 1½ tons, 2987 pounds, costing at \$6 per ton, \$8; No. 2, 1½ tons, 3360 pounds, costing \$9; No. 3, 1½ tons, 3734 pounds, costing \$10. The amount of limestone required varies with its quality, the composition of the ores and fuel, and the grade of iron required. Alumina, lime and magnesia are valuable constituents of a siliceous ore, as they diminish the amount of limestone required for flux, and consequently increase the working capacity of the furnace, as well as diminish the cost of production.

Under the conditions of this discussion it may be approximately assumed that 1 per cent. of alumina is equal to 1½ per cent. of lime; that 1 per cent. of magnesia equals 1½ per cent. of lime; that 1 per cent. of lime will flux 0.6 of 1 per cent. of silica, and that the limestone used will, after fluxing itself and the coal ashes, contain 45 per cent. of free lime. Now to determine the cost of flux required. Ore No. 1 contains to balance 6.104 per cent. of silica, only 0.099 per cent. of alumina; this, from the proportions given above, will flux 0.0985 per cent. of silica, leaving 6.006 per cent. to be disposed of by added limestone. Since 1 per cent. of lime will flux 0.6 of 1 per cent. of silica, it will take 10.01 per cent. of lime to flux 6.006 per cent. of silica; and since the limestone contains 45 per cent. of available lime, 10.01 divided by 0.45, which is equal to 22.24, will be the per cent. of limestone which must be added to flux ore No. 1. As 3556 pounds of

this ore are used to produce a ton of iron, 22.24 per cent. of 3556 (which is 792) will be the number of pounds of limestone needed per ton of iron; 792 pounds, at \$1.50 per ton, cost \$1.19 cents.

Ore No. 2 contains 18.8 per cent. of silica, which is balanced by only 0.604 per cent. of alumina, hence, by the same mathematical process, we find that this ore requires 2779 pounds of limestone, costing \$1.86 to the ton of iron produced.

Ore No. 3 contains 13.108 per cent. of silica, which requires to flux it 21.851 per cent. of lime; to balance this there is 2.005 per cent. of alumina equal to 3.048 per cent. of lime; 1.980 per cent. of magnesia, equal to 2.970 per cent. of lime, and 7.308 per cent. of lime, a total of 13.626 per cent. of lime, or its equivalent supplied by the ore against 21.851 per cent. required. The difference, 8.225 divided by 0.45 gives 18.3 as the per cent. of limestone which must be added. 18.3 per cent. of 4978 (ore required for a ton of iron) is equal to 911; 911 pounds of limestone at \$1.50 per ton, cost 61 cents.

It is evident that within certain limits, labor and salaries per ton will be almost inversely as production. Suppose that the furnace under consideration consumes 100,000 pounds of coal per day, which is a fair average allowance for a whole blast. No. 1 makes a ton of iron with 2987 pounds of coal, hence it will produce 100,000 divided by 2987 or 33.46 tons per day. No. 2 uses 3360 pounds which makes the daily production 29.76 tons. No. 3 requires 3734 pounds consequently its production will be 26.78 tons daily. If labor and salaries amount to \$3 per ton on No. 1, they will be \$3.89 on No. 2, and \$3.76 on No. 3.

I will now, for convenience in comparison, average in tabular form the results obtained.

Elements considered.	No. 1.	No. 2.	No. 3.
Yield by analysis.....	63.1	57.4	48.0
Yield in the furnace.....	63.1	57.4	48.0
Average daily production.....	33.46	29.76	26.78
Ore used per ton of iron.....	3556	4148	4978
Cost of ore.....	2987	3360	3734
Limestone.....	792	2779	911
Cost of ore.....	\$15.88	\$12.97	\$13.22
Cost of coal.....	8.00	9.00	10.00
Cost of flux.....	3.16	3.89	3.76
Labor and salaries.....	3.00	3.89	3.76
Contingent expenses.....	30	30	30
Total cost.....	\$27.91	\$27.72	\$27.99
Cost of ore per ton.....	10.00	7.00	5.50

It is evident that if a ton of iron can be made from ore No. 3 for \$27.09, when a ton from No. 2 costs \$27.72, No. 3 is the cheaper ore; but the figures show that its advantage is due only to the great excess of silica in No. 2, and the consequently increased cost of flux required. If these ores had been compared only with reference to the cost of ore per ton of iron, the balance would have been a little more favorable for No. 3, but if the other constituents of the ores had been exchanged, this favorable balance for No. 3 would still be shown, when, in reality, No. 2 would be much the cheaper ore, and it is only by a full comparison, point by point, that a true result can be arrived at.

This question of comparative values may come up in another shape—it may be desirable to know what it would be safe to offer for No. 3 as a substitute for No. 2. To determine that subtract the cost of all items, except ore, required to produce a ton of iron from No. 3, from the cost of a ton of iron made from No. 2; the difference, \$12.85, is the value of No. 3 ore per ton of iron, and 45 per cent. of this, \$5.78, is the value of No. 3, when No. 2 is worth \$7.00. In the same way the value of each ore could be found when (the cost of other things remaining the same) iron must be made for a fixed price, say \$30.

Twenty dollars, less the cost of coal, labor, &c., for No. 1 leaves \$7.97, and 63 per cent. of this, the value of one ton, is \$5.02. In the same way, No. 2 would be worth only \$3.84, and No. 3, \$2.16.

It is evident from the preceding analysis of the elements which control values, that as coal and labor advance the relative value of a lean ore as compared with a rich one diminishes very rapidly.

In the example given above, while the figures will not vary much from good practice and materials of a similar constitution, my intention is simply to indicate a process which may be applied to any varieties of ore, fuel or pig iron, by making proper substitutions in the relative proportions of materials and items of expense. The whole subject may be briefly summed up as follows: To find the value per ton at the furnace of any ore.

1st. Obtain a reliable analysis and chemical opinion as to injurious substances, properties, &c.

2d. Ascertain as carefully as possible, from practical furnacemen, how it works in the furnace, as some ores are more inclined to produce scaffolds, and equally bad effects, than others—one ore will make a sharp, cutting clinder, while another is continually building on in the hearth.

3d. Taking the cost of making a ton of iron at some fixed standard, subtract from that the estimated cost of all items, except ore, required to produce a ton of iron from the ore whose value is to be determined; multiply the difference by the expected per cent. of yield in the furnace, and the result will be the required value per ton.

4th. If this be less than the price of the ore, determine whether it has properties valuable enough to make up the difference.

5th. Make such contracts that the ore companies shall be obliged to guarantee the quality by standard analysis.

A careful application of these principles, and the selection of materials with a correct understanding of their effects in producing a desired result, will help a little to solve the problem of cheap and good production.

Petroleum springs have been discovered on the Luneberg Heaths, in Northern Germany. The petroleum is obtained by simple borings, and at some spots, as the village of Wetzlar, the sand is saturated with rock oil. Its clearness,

purity and specific weight, the Luneberg is said to be identical with American petroleum, and to be, moreover, almost entirely without smell of any kind.

Annual Report of the Philadelphia & Reading Railroad Company.

The annual report of the Philadelphia & Reading Railroad Company, read at the meeting of that company on the 11th inst., by Franklin B. Gowan, Esq., president, presents a number of facts of great interest to the general public outside of the stockholders of the company, and we therefore give a brief condensation of these below.

The following figures of gross receipts and expenses, compared for the years 1873 and 1874, while the least interesting of the report, show a very gratifying result in economy. Thus, the gross receipts for 1874 were \$14,452,122, against \$14,882,661 in 1873, while the gross expenses in 1874 were \$8,731,916, against \$9,474,895 the year previous, leaving a net profit of \$5,720,206 for 1874, against \$5,357,766 in 1873, showing that notwithstanding a decrease in receipts of nearly half a million, the loss has been saved, and an increase in net profits of \$362,440, or 6.8 per cent., has been made by the wise economy enforced. The result of the year's business shows receipts, over cost of working, of \$5,570,302.82, which, with the additions of State taxes, refunded interest, &c., makes a total receipts of \$7,071,874.65, and leaves, after the necessary deductions for sinking fund, &c., a dividend fund for 1874 of \$4,638,372.79, from which four dividends have been declared, and a balance of nearly a million dollars remains as reserve fund.

Notwithstanding the depression, the receipts of the company have been larger than those of any previous year except 1873, while the profits are the greatest ever yet made. The number of tons of coal carried—the gross ton being in all cases computed—was 6,348,313, a decrease of 3 per cent. as compared with 1873, and it is curious to note that the increased demand for anthracite coal for domestic uses has almost made up for the loss of tonnage resulting from the decrease in demand for manufacturing purposes. Some estimate of the capacity of the road and equipment may be formed from the statement that during the month of October alone 902,985 tons of coal were transported, equal to a weekly tonnage of 200,000 tons, and that during one day of the same month 42,282 tons were carried. As to the management and its efficiency, it is enough to state the fact that within a fraction of seven million passengers were carried during the year without injury to any from fault or negligence of the company. As is generally known, this company has manufactured its own rails, having a very carefully conducted and completely equipped rolling mill at Reading. The quality of the rails made at this mill, and the average life in service for a series of years, is shown by the table here given. It is to be noted that the percentage of rails removed from the track, of the product of 1873 and 1874, is not correct, as the entire product for these years has not been laid. The statement that over 50 per cent. of the product of 1865 is still in the track, and has, in the seven years of track life, been subjected to a tonnage of over fifty million tons, speaks more for the quality of the iron and thorough workmanship than most rail mills can boast of. The company has also over 90 miles of steel rails laid in their most exposed places, and the president says: "To their good quality, and that of the iron rails made at the company's mill, the saving of roadway expenses during the past year is to be attributed."

PRODUCT OF THE RAIL MILL.

Year.	Product.	Worn out.	Per cent.
1865	1,000,000	100,000	10
1866	1,200,000	120,000	10
1867	1,400,000	140,000	10
1868	1,600,000	160,000	10
1869	1,800,000	180,000	10
1870	2,000,000	200,000	10
1871	2,200,000	220,000	10
1872	2,400,000	240,000	10
1873	2,600,000	260,000	10
1874	2,800,000	280,000	10
1875	3,000,000	300,000	10
1876	3,200,000	320,000	10
1877	3,400,000	340,000	10
1878	3,600,000	360,000	10
1879	3,800,000	380,000	10
1880	4,000,000	400,000	10
1881	4,200,000	420,000	10
1882	4,400,000	440,000	10
1883	4,600,000	460,000	10
1884	4,800,000	480,000	10
1885	5,000,000	500,000	10
1886	5,200,000	520,000	10
1887	5,400,000	540,000	10
1888	5,600,000	560,000	10
1889	5,800,000	580,000	10
1890	6,000,000	600,000	10
1891	6,200,000	620,000	10
1892	6,400,000	640,000	10
1893	6,600,000	660,000	10
1894	6,800,000	680,000	10
1895	7,000,000	700,000	10
1896	7,200,000	720,000	10
1897	7,400,000	740,000	10
1898	7,600,000	760,000	10
1899	7,800,000	780,000	10
1900	8,000,000	800,000	10
1901	8,200,000	820,000	10
1902	8,400,000	840,000	10
1903	8,600,000	860,000	10
1904	8,800,000	880,000	10
1905	9,000,000	900,000	10
1906	9,200,000	920,000	10
1907	9,400,000	940,000	10
1908	9,600,000	960,000	10
1909	9,800,000	980,000	10
1910	10,000,000	1,000,000	10

Of the iron steam boiler fleet, the report announces that seven new ships have been added to the list, of which five were built at Philadelphia and two at Chester. The total number of tons carried by the fleet in 1874 was 217,340, from the transportation of which a profit of \$6,590.85 was earned, or 1.29 per cent. This small profit is accounted for by the expenses attending the receipt and introduction of seven new ships, and principally by the low rates of freight ruling during the year. Low freights are, however, more desirable for the company than a profit in its colliers, which have alone been built to secure the company against the difficulties and expenses attending a scarcity of sailing vessels for distributing the coal. As has been also referred to hitherto in these columns, the company has been engaged in constructing an extensive shipyard at Port Richmond, Philadelphia. This, the report announces, is now completed but not yet put into operation, owing to difficulties in regard to closing certain proposed

streets running through the property. These have now been overcome, and it is to be presumed operations will be commenced in the near future, giving employment to a large number of men, and adding to the consumption of iron.

Of the purchases of coal lands made during the year by the Reading Coal and Iron Company, the total added to those previously acquired makes an aggregate of 100,000 acres. It is not proposed to purchase any more at present, except such intervening lands as may be required. Owing to the inefficiency of tenants, the company has been forced to work these lands itself, and of the 82 collieries now in operation on the lands of the company, 37 will be worked by the company itself. To dispose of the product of these collieries the company has opened large retail yards in the city of Philadelphia, obtained wharves and shipping facilities in New York and the various Eastern ports, and it is believed that no company now possesses greater advantages in economical mining and disposing of a large product to the best advantage, the only improvement wanted, according to the report, being a depot of sufficient size to contain at one place five hundred thousand tons of coal in order to keep the collieries at work and avoid the expense of stopping them when orders are scarce or vessels not in sufficient supply to carry away the products.

As the most important event of the year to the company the president considers the discovery in the new shafts near Pottsville, which were projected to reach the large white ash coal veins of the Southern Basin, of the Mammoth vein with thirty-nine feet of superincumbent coal, giving in all a total of sixty-five feet of workable coal. The deepest of these shafts was sunk to a depth of 1123 feet, from which a bore hole was continued to a distance of 1854 feet from the surface of the ground. The importance of this discovery justifies our quoting the words of the report in regard to it, viz: "The extent of territory tributary to these shafts is so great that there can be but little doubt that at least one hundred millions of tons in the several veins already opened can be worked through them, and that for almost an indefinite period the proposed colliery will be one of the most productive known. When it is considered that the deposits of coal thus opened and proved extend throughout the entire length of the Southern coal field, principally underlying lands bought at exceedingly low prices, and heretofore considered by many as comparatively valueless, and which are within one hundred miles of tidewater at Philadelphia, the importance of the developments made by the shafts cannot be overestimated."

The tonnage of the lands owned and controlled by the Philadelphia and Reading Coal and Iron Company from collieries worked and leased by the company for 1874, was 5,100,000 tons, and while this is not, under present depression, required, it is expected a ready market will be found for it all in the near future. It is with an evident and natural complacency that the president remarks, that when it is considered that the anthracite coal trade of the United States has reached nineteen million tons; that it doubles every ten years, and that in ten years it will be 40,000,000 tons, and that the Philadelphia and Reading Coal and Iron Company owns at least one-third of all the anthracite coal land of Pennsylvania, but little doubt can reasonably be entertained of the future success of the company. The report thus evidently shows an agreeable state of affairs to the stockholders, while the continuance of the wise policy of present economy and prudent foresight which has hitherto characterized the management, and made it what it is, will doubtless produce all the results expected. The only omission, and to the iron trade a serious one, we think, is that no notice is made in the report of the purchases by the company of iron ore lands, which, it is known, have been made to a considerable extent during the last year, or to the policy to be maintained in this direction for the future. Possibly these omissions may be supplied when the official document is issued, but we must regret the silence upon a topic of so much importance to the furnaces of the seaboard, and to the development of the later discoveries of rich iron ores tributary to them.

Restoring Burnt Steel.

We have received the following letter from Prof. Thurston:

STEVENS INSTITUTE OF TECHNOLOGY, MECHANICAL LABORATORY, DEPARTMENT OF ENGINEERING, HOBOKEN, N. J., Dec. 22, 1874.
To the Editor of The Iron Age—DEAR SIR: At the request of Mr. Schierloh, I was present at the Delamater Iron Works, at the recent extended test of the cherry heat welding compound which has been referred to by you in The Iron Age.

In further compliance with his request, I take pleasure in stating that I witnessed all of the tests then made. The welding of iron to iron, of steel to steel and of steel to iron, the working of a pile of scrap steel into bar, and other similar tests were very satisfactorily performed. A piece of tool steel, melted and burned into a cinder like scrap, was worked into a chisel, which I saw used, and which I subsequently tried myself, upon a hard cast iron. It retained its edge, I thought, rather better than the chisel which the workman was found using on the same lot of castings.

Samples of the original piece of steel, of the burned steel, and of the chisel, were sent to Professor Leeds, the chemist of the Stevens Institute of Technology, for analysis. The original steel was found by him to have lost about 30 per cent. of its carbon by the treatment to which it was subjected, and which resulted in the production of the so-called "burnt" steel. Reworking this into the chisel, just referred to, the percentage of carbon appears to have increased by about 10 per cent. of the original amount, a change which I presume to be due to the thorough expulsion of the oxide and the scoria with which the second sample was charged. This cleansing of impurities was evidently very perfectly done.

Another piece of steel, worked at so high a temperature that it broke up, was made into a knife, the cracks disappearing in the process, and the blade becoming perfectly sound and good.

I am pleased to be able to speak so favorably of these experiments, and to testify to the value of the material. Very respectfully,
R. H. THURSTON.

Nickel Plated Screws.—In car building, nickel plated screws are rapidly coming into general use. This grows out of the fact that though their original cost may be a trifle more than silver plated screws, yet as nickel does not oxidize by exposure to air, the excess of cost is more than made up in the durability of the plating. Hence, in nearly all the large car manufacturing nickel plated screws are superseding silver plated for use in joinery work. Just where house builders have been slow to practically recognize their superiority, we are at a loss to conceive, unless, indeed, they cling to the "penny wise and a pound foolish policy" of making a trifling saving in original cost at the expense of an intimate greater loss in durability. We are glad to notice, however, a gradual but steady increase in the use of nickel plated screws in house joinery, which argues well for their final adoption for all such work in which silver plated screws are now employed.—*Builder.*

A little canal of 23 miles was wanted in China in 1835. Time must be precious there, though life is so cheap. Only six weeks were given in which to dig it, though it went through great forests and over extensive marshes. 20,000 men worked upon it day and night, and over 7000 died of fatigue.

Every architect and engineer in Portland, and two leading building firms, have agreed to use in all their professional work the metric system of length after July 4, 1875, provided the engineers of four other cities agree to do likewise, and it is understood that the probabilities are that not only four, but forty, other cities will come into the plan.

Special Notices.

Business Chances.

HARDWARE.

A man with from \$15,000 to \$25,000 cash, can connect himself with an old established Commission and Jobbing House in Boston, where capital is only required to extend the business. Address in full name, **P. O. Box 3205, Boston.**

Wanted.

BOLT, RIVET AND NUT MACHINES,
Also a few Nail Machines.
Any one having some first-class second-hand Machines, can address, **T. M. ROBERTS,**
Drawer 26, Montreal Post Office.

PARTNERS WANTED

More working capital needed. Grounds, Shops, Tools and Machinery, all in good working order. A rare chance for parties desirous of engaging in the manufacturing business. Correspondence solicited. Address, **D. WHITING,**
Ashland, O.

Dissolution of Partnership

Notice is hereby given that the partnership heretofore existing in the name of "Jesse W. Starr & Sons," between **JESSE W. STARR, BENJAMIN A. STARR, BENJAMIN F. ARCHER, and JESSE W. STARR, Jr.,** has this day been dissolved by the undersigned, three of said partners, according to the provisions of their articles of partnership.

The unsettled business of said firm will be adjusted by the undersigned.
JESSE W. STARR, BENJAMIN F. ARCHER, JESSE W. STARR, Jr.,

(Dated)
Camden Iron Works,
Camden, New Jersey, December 31, 1874.

Merchant Iron or Nails

Wanted in exchange for 300 tons No. 1 Wrought Scrap Iron.
GILCHRIST & GRIFFITH,
Mount Pleasant, Iowa.

Wanted.

By an experienced man who has a large acquaintance with the wholesale and retail hardware and house furnishing merchants throughout the West, a position as traveling salesman. Can furnish good city references. Address, **P. A. C.,**
Office of The Iron Age, 10 Warren St., N. Y.

An iron worker of large experience in this country and Eng and with the best testimonials as to character and capacity, wishes an engagement as manager or foreman of a mill or forge. Has had 20 years' experience in the manufacture of bars, hoops, plates, sheets, and puddle steel.

Address, **J. L.,**
Office of The Iron Age, 10 Warren St., N. Y.

THE Fletcherville Blast Furnace Co.,

Manufacture

CHARCOAL PIG IRON,

Exclusively from New Bed Pure Magnetic Ore, suitable for Bessemer, Malleable and Car Wheel purposes, or for foundry use where very soft and strong iron is required.

Analysis of Average New Bed Pure Ore.	Analysis of No. 1 Bessemer Pig.
Metallic iron.....68.240	Underestimated material and loss.....124
Oxygen with iron.....26.010	Silica.....1.019
Waste......380	Carbon.....3.821
Insoluble silicious matter.....4.390	Phosphorus......048
Sulphur, practically none	Sulphur, pr. critically none
Phosphorus......038	Calcium......140
Alumina......280	Metallic iron.....94.838
Lime......140	
Underestimated material and loss......592	
	100.000

Witherbee & Fletcher,
Port Henry, Essex Co., N. Y.
Furnace at FLETCHERVILLE, near Minerva, N. Y.

An experienced buyer of Hardware, Tools, Machinery, Saws, &c., will arrange with responsible houses on commission. Purchases made at lowest market rates. Correspondence solicited.
Address, **J. M.,**
Office of The Iron Age, 10 Warren St., N. Y.

Special Notices.

An experienced Mechanical Engineer, familiar with estimating and designing Propeller and general Marine Machinery, Locomotive, Corporation Pumping Engines, &c., will shortly be engaged. Would like a superintendency or charge of a drawing room.
Address, for reference, **A. E. W.,**
114 Fulton Street, N. Y.

MERCANTILE AGENCY.

For the sale of Hardware or any Mercantile Business. Stores of all kinds for sale and wanted. Parties desirous of going in to business cannot do better than to address this agency. Also clerkships secured, best of reference required. Parties wishing clerks or assistants, stamp enclosed gives full particulars. Address, **JOHN J. HARRIS,**
Box 1633, Binghamton, N. Y.

For Sale.

A new machine for making BOLT HEADS, from one half inch to inch. Also new BOLT HEADS, &c., for heading screw bolts from three-eighths to inch. Duplicates of each in successful operation for ten years. Will exchange for iron or wrought scrap.
Address, **RIVETS,**
Office of The Iron Age, 10 Warren St., N. Y.

TO INVENTORS.

Patents secured in the United States and Europe, on the lowest terms and very
PROMPTLY,
by **A. V. BRIESEN,** Solicitor of Patents and Attorney at Law in Patent Cases.
258 Broadway, N. Y., cor. Warren St.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Angers and Bits, each running seventeen years; dated as follows: Dec. 19, 1855; January 31, 1866; and July 3, 1866. There is a special claim on each of the Dies. All persons in bringing in said patents will be responsible to the extent of the law. **Russell Jennings,**
DEER RIVER, Conn., Sept. 7, 1874.

AGENTS WANTED.

SPECIAL INDUCEMENTS.
We want a first-class agent in every country in the United States, and also in Europe, to sell the world-renowned Wilson Sewing Machine, and the Wilson Manufacturing Machines, to whom we are prepared to offer Extraordinary Inducements. For full particulars, apply or address **Wilson Sewing Machine Co.,** 527 & 529 Broadway, N. Y. Special Inducement to Exporters.

The undersigned have entered into co-partnership under the name and style of
JESSE W. STARR & SON,
and will continue the business at the Camden Iron Works, Camden, N. J., as heretofore.
JESSE W. STARR, JESSE W. STARR, JR.,
CAMDEN IRON WORKS, Jan. 1, 1875.

"Special Notice."

WANTED.—To exchange, First-Class Improved City Property, in the city of Philadelphia, to the amount of one hundred thousand dollars, clear of all incumbrance, for a good article of Pig Iron for same amount, to be delivered here. Address
IRON,
P. O. Box 2841, Philadelphia.

Charcoal Blast Furnaces.

Having during the past 10 years constructed and put in operation a number of the most successful Charcoal Blast Furnaces in the country, and having a competent corps of workmen constantly in my employ, I am enabled to offer advantages in constructing or remodeling upon the latest and most approved plans.

Examinations of Furnace Property made and reported upon when solicited. Correspondence promptly attended to.
J. M. WHITE, Engineer,
22 W. Alexander St., Rochester, N. Y.

THE CANADIAN BANK OF COMMERCE.

Capital - - \$6,000,000, Gold.
Surplus - - \$1,800,000, Gold.

The New York Agency, No. 50 Wall Street, buy and sell Sterling Exchange, makes Cable Transfers, grants Commercial Credits, and transacts other Banking Business.

J. G. HARPER, J. H. GOARBY, Agents.

MANUFACTURERS

Desires of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

A PARTNER WANTED

by the 1st of January, 1875, in an established Hardware business, who can put in from \$20,000 to \$25,000, either cash, or stock suitable for jobbing trade.

For particulars, address, **B.,**
Office of The Iron Age, 10 Warren St., N. Y.

HARDWARE.

FOR SALE in the best business part of Jersey City, a first-class Tool and Hardware business. Established about 25 years, and doing a fair business. Apply to **H. LUTGEN,**
57 Montgomery St., Jersey City.

Wanted.

A situation as bookkeeper or cashier of an iron works, a hardware business, or in the coal trade, the advertiser understands in all its branches. Highest references of character, capacity, &c.

Address, **H. D.,**
Office of The Iron Age, 10 Warren St., N. Y.

A. PURVES & SON,
Corner South & Penn Streets, Phila.
Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Habbit Metals, Foundry Facings. Best Quality Ingot Brass. Cash paid for all kinds of Metals and Tools.

Special Notices.

New York, Jan. 12th, 1875.
Messrs. Bissell & Co., having associated with them in business Mr. L. R. Welles (late Morrell, Welles & Jewett), the name and style of our firm will hereafter be
BISSELL, WELLES & MILLET,
Late BISSSELL & Co.,
Auctioneers, 94 Reade Street.

REMOVAL NOTICE.

On the 1st of February next we shall remove to the large store, No. 15 Murray Street (near Broadway), where we shall be pleased to see our friends. Coffee, molasses, &c., for our regular weekly sales of Hardware respectfully solicited.
BISSELL, WELLES & MILLET.

EUGENE BISSELL, Auctioneer.

SPECIAL AUCTION NOTICE.

Peremptory Cash Sale.

Bissell, Welles & Millet,
AUCTIONEERS,
Late BISSSELL & Co.,
will sell at Auction on Tuesday, Wednesday and Thursday, January 26th, 27th and 28th, by order of a large wholesale house, who are retiring from business, at 594 Broadway, under the Metropolitan Hotel, one of the finest and best selected stocks of

Hardware, Cutlery, Guns, &c.,

overoffered in this city, and valued at over \$40,000, together with all the Store Fixtures, Shelving, Counters, 50 ft. Glass Gun Cases, fine Circular Desks, &c. &c. The stock comprises in part, 300 doz. Table Knives and Forks, 150 doz. Ivory Table and Des. Knives, 100 doz. W. & B. Razors, 500 doz. Geo. Wostenholm's and Rogers' Pocket Knives, 1200 doz. J. Moulton and Monumental do., 300 doz. Scissors and shears, 1200 doz. Brit. and Iron Tea and Table Spoons, 375 fine Eng. Single and D'ble Guns, 100 fine Revolvers, Pearl, Ivory and R. W. Stocks, 300 doz. Eng. and American Pad Locks, 300 doz. Files, 1500 gross Gimlet Screws, well assorted, 100 doz. Coffee Mills, 50 doz. Tea Ballers, 100 doz. D. H. and L. H. Shovels, 500 prs. Pin & Sauce Pans, 600 prs. Trace Chains, 10,000 lbs. Coil, Ox, Log and Fougne Chains, together with a large assortment of all the various kinds of Builders' and House Furnishing Hardware adapted to the trade.

Also, an immense number of Samples and Sample Cards, all of which are clean and fresh, and can be used again for the same purpose.

Out of town buyers can have their goods carefully packed and shipped.

Those who desire can inspect the stock on Monday the 25th. Catalogues ready Saturday, 24th instant.

BISSELL, WELLES & MILLET,
Auctioneers.

A gentleman with references and experience would undertake the collection and settlement of accounts for a house declining or continuing business, where special effort, tact and ability is required. Would travel. Address
B. G.,
Office of The Iron Age, 10 Warren St., N. Y.

For Sale, &c.

LOWE & THOMASSON,

Chattanooga, Tenn., Dealers in

MINERAL LANDS.

Surveys Made and Titles Investigated. Parties desiring information or wishing to purchase ore or coal lands within the States of Tennessee, Alabama or Georgia, are respectfully requested to communicate.

We have For Sale Very Cheap

Two of the

Finest Charcoal Properties

in America. Brown Hematite Ore, 56 per cent. Metallic Iron, and less than 1-20th of 1 per cent. of Phosphorus. Car Wheel Iron can be made for \$16 per ton. Also, 6400 Acres Bituminous Coal Lands, for which part payment will be taken in Northern Pacific R. R. Bonds.

Great Auction Sale

Of Valuable Machinery and other property.

The undersigned Trustees will offer for sale at Public Auction in the city of Auburn, N. Y., all the interest in Letters Patents, Patents, Tools, Machinery, Stock and Fixtures, including "Extra" for Repairs, belonging to the late DODGE & STEVENSON MFG. CO.

THIS LARGE PROPERTY

consists in part of Shafting, Pulleys, Iron Planers, Lathes, Drills, Screw Cutters, Shears, Presses, Planes, Grinding and Polishing Machines, Boring and Slotting Machines, Circular and Jig Saws, Wood Planes, Shaping Machines and other machinery for wood working; Brass Furnace and fixtures; Pattern Molds, Tumbling Barrels and Tools and fixtures for Iron Furnaces; Blacksmiths' Forges, Fans, Vices, and large quantities of Smith Tools; Lumber, Iron, Paints and other stock.

The same is on exhibition at the works of the late company, and printed lists with descriptions and terms of sale can be obtained at same place or by letter addressed to G. J. LETCHWORTH, for Trustees, Auburn, N. Y.

This sale will be of special interest to Manufacturers of Hoppers and Mowers, and other Agricultural implements, as well as to Machinists, and dealers in Second-Hand Machinery. Sale will commence on Monday, January 25, 1875, at 9 A. M., and continue till sold.

ACTUARY, December 29, 1874.
G. J. LETCHWORTH, H. G. TOMPKINS, J. S. FOWLER, FRED. M. TERRILL, Trustees.

To Rent.

First and third floors—together or separate. Brick building 125x50, well lighted and the best business location in the city. Light power will be supplied if desired, or parties can furnish their own if preferred. Address, with particulars,
H. D. STANLEY, Secretary,
Bridgeport, Conn.

For Sale or Rent on Easy Terms

A four story brick factory 46x60 ft., with unfailing water power of about 35 horse-power, auxiliary steam engine of 20 horse-power. Adjoining are office, barn and outbuildings. Situated near depot of three railroads, and lines of boats to New York and Philadelphia. Every facility for manufacturing and getting goods to market at cheapest rates. Apply in person or by letter to either
ROBERT W. ALSTON, ROBERT N. JACKSON, CHARLES E. JACKSON, Executors.
Middletown, Conn.

FOR SALE.

An 8 1/2 inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.

Apply to **W. W. JONES,**
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

For Sale.

PUBLIC SALE

Of a Valuable Iron Property

In Augusta County, Virginia.

The undersigned Commissioners, in pursuance of a decree of the Circuit Court of Augusta county, Virginia, in three Chancery causes (brought on to be heard together), in which Denwood & Son, Raymond & Campbell, and Kier, Cooper & Co., are respectively Plaintiffs, and the Buffalo Gap Iron and Steel Company and others, Defendants, will sell at public auction, on

Wednesday, the 3d day of March, 1875,

at BUFFALO GAP, in the aforesaid county, all the

REAL ESTATE

of above named company. Said Real Estate embraces a tract of

MINERAL LAND,

containing about 1450 acres, with

TWO VALUABLE IRON FURNACES

thereon; and a FARM of about 800 acres. These two parcels of Land will be sold separately.

The Mineral tract lies in and around a depression in the North Mountain range, through which the Chesapeake & Ohio Railroad passes, known as Buffalo Gap. The veins of ore on this land have been but partially developed, owing to the fact that the Furnace heretofore operated on it was plentifully supplied with good ore from the neighborhood, delivered at the furnace, at an average price of \$2.50 per ton.

Competent mineralogists and miners, who have examined the openings made on the property, express the opinion that ore exists on it in very large quantities.

There are quarries of good limestone on the land; and much of it is well timbered.

THE FURNACES

are immediately on the Chesapeake & Ohio Railroad, in the great Iron Region of Virginia, and about 150 miles from the Coal Fields of West Virginia, which are traversed by said road. They are ten miles west of Staunton and 147 miles west of Richmond.

FURNACE No. 1 has been in blast for several years, and has operated well. No. 2 is entirely new, indeed not quite complete; but the materials for its completion are on hand and the work can be done in a few days.

Each of them has an Iron Jacket Stack, built on iron columns. No. 1 is 38 feet high and 9 feet across the top, to which is connected a Player Hot Oven. No. 2 is 40 feet high, 10 feet across the top, with a Raymond & Campbell Hot Oven.

There are three Cylinder Boilers, 40 feet long, three feet in diameter, and in excellent condition; a 60 horse power engine with two blowing cylinders, capable of making 7 lbs. of blast to the square inch, and in complete order; two water tanks with a capacity of 60,000 gallons, supplied from a never failing stream; a steam fire donkey engine, connected with several hundred feet of gum hose; an ample bridge or stock house, casting houses and two calcining kilns—in fine, the Furnaces are, in all respects, first-class.

Around them is a village of 25 or 30 houses, embracing a handsome and spacious manager's residence, offices, stables, shops, laborers' houses and a neat chapel.

THE FARM

hereinbefore mentioned adjoins the tract of Mineral land. It is well watered and timbered; and is very productive. Improvements consist of a large BRICK BUILDING, Grist Mill, Saw Mill, Tannery House, a large Barn, and all the other out houses usually found on a good farm in the Valley of Virginia.

Parties proposing to buy are invited to examine the aforesaid property before the day of sale. Mr. John Tierney, who is in charge of the furnaces at Buffalo Gap, will take pleasure in showing the property; and the undersigned Commissioners, who may be addressed at Staunton, Va., will take pleasure in answering inquiries concerning the same.

At the same time and place will be sold whatever PERSONAL PROPERTY the Buffalo Gap Iron and Steel Company may have on their premises at Buffalo Gap.

Terms on which aforesaid property will be sold are as follows: Ten per cent of the purchase money will be required in cash, 15 per cent in four months, and the balance in three equal annual installments from the day of sale, with interest from the last named day. For all deferred installments of purchase money, the purchaser will be required to give bonds with approved personal security, and the title will be withheld as ultimate security.

GEORGE M. COCHRAN, JR., THOS. C. ELDER, Commissioners of Sale.

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At the same time and place will be sold whatever PERSONAL PROPERTY the Buffalo Gap Iron and Steel Company

OLD RAILS.		
Double Heads.....	currency,	nominal
T or Flange.....	"	\$26.53 @ \$27.00

Total to date	"	2,760
Same time, 1873	"	10,271
SHEET IRON.		
No. 1 Wrought	currency, \$30 00 @ \$3 00	
PIG IRON.		
American Forge	currency,	\$1 00 @ 33 00
No. 1 Foundry	"	24 00 @ 35 00
No. 2 Foundry	"	25 00 @ 30 00
Scotch No. 1 Foundry	"	31 00 @ 30 00
Import of Foreign this month		1,654
Previously since January 1st		28,403
Total to date	"	30,057
Same time, 1873	"	58,214

METALS.

Copper.—Sales for the week sum up between 200,000 and 250,000 pounds Lake, on the spot, at 23½¢. The market is in such a position, that in order to sell lower prices would

have to be accepted, while, in order to get a good round lot, between \$1½¢ and \$1½¢, would probably have to be paid. The market is in fact quiet; very little offers, and there are but few buyers. We quote Lake \$1c, on the spot. The latest news we have from Europe by cable is about a week old, when Chili Bars were officially quoted \$24, and Best Selected, \$25. Meanwhile, later London accounts have also been received by mail, according to which the Chilean charters for November footed up the large aggregate of 5000 tons.

while as much was actually shipped, and the fore half of December again showed 2700 tons charters. These statistics were cabled to London via Montevideo on the 19th December. Up to the time the last three months showed

together 1,000 tons charters. That under such circumstances the London market should decline 30, as was the case then, dropping to £28, 10 for Chili Bars, causes no surprise. The impression seemed to be at London that Chili would now cease to be a heavy shipper, London being £1 (or £1, 10 below Valparaiso parity, and that easier money would revive the speculation early in the new year. Although the value in England, as we are situated, has no direct practical bearing upon our own market, we are always more or less influenced by the course of prices there. A rising tendency on the

Tin—Has been quiet, and the sales reported are but of limited extent. Holders persevere

in the same firm attitude, confirmed therein by the European cable quotations, which were on the basis of £35 for Straits Tin yesterday. We quote, in gold, at follows: Straits, 225½; L. and F., 217½. @ 22c.; English Refined, 22c.; and Banca, 29c. @ 26½c. Singapore, on Saturday, offered Tin by cable at the parity of \$24.50 per picul for Malacca, which is a decline of half a dollar. We have been shown a private letter of one of the partners of a Singapore Lodon firm, dated London, 23d ult., from which we extract the following passage alluding to Straits Tin: "Tin is firm at £34, with some speculative buying keeping the market active. If liberal supplies come forward, we look for some decline, but £5 per ton would now be enough to make many people look carefully at it. There are always many chances in favor of

an article that is relatively so cheap as Tin would be at anything below £30." Reports are again afloat of a strike in some Welsh Tin Plate works. If confirmed, it may lend additional strength to Plates there, strong as they are. Sales of the latter have amounted for the week to some 2000 to 3000 boxes in a jobbing way, at full prices, there evidently being an improved demand. We quote them as follows, all

in gold: 1 C. Charcoal, \$10 per box for good brands; Charcoal Trade, \$8 62½ @ \$9; 1 C. Coke, \$7 75 @ \$8; and Coke Trade, \$7 @ \$7 50, the latter two ordinary brands.

Lead.—This metal has been as stagnant as ever, the sales in a small way not exceeding 50 tons, at 6½¢, gold. Foreign is also inactive at the asking price of 6½¢, gold. Holders of Domestic Lead will have to exercise some patience, but will be rewarded in good time, the stocks being unusually light on this coast, and when later on the revival does come, we may witness a material rise in value. Offers have been telegraphed here from London, cost, freight and insurance, of Spanish Soft Lead at £33 16 6, three months' time. The accounts from

Europe are a little better; although the arrivals from Spain had somewhat increased during December, they had been readily absorbed in the North of Europe, while at Marseilles they still kept down the market. As for a political settlement in Spain, and consequent full resumption of mining, the prospects seem as far off as ever, and it is not believed that telegrams. The manufacturers of Lead are steady at 8½% currency, for Bar, Pipe and Sheet, less 10 per cent. to the trade.

Spelter and Zinc.—News is to hand from Hamburg direct by the latest mail, according to which the most inferior Spelter at Breslau is 10½% dearer than the best, this is equal to 7½% gold, laid down at New York, and bringing thereto the gold premium of 12½ per cent. This Spelter comes to stand 80½% currency, while Domestic commands no more than 66½% currency, at the present moment. A lump offer would probably purchase a good article at 75½% currency, and the best of Domestic is about 7½% cheaper than Comstock Silesian. There is little Foreign here at present, say 15 tons C. G. H., limited at 7½%.

gold, and 45 tons Silesian Union, limited at 10c., gold. There is none afloat for New

York. We observe a complete absence of demand for both Foreign and Domestic, and quotations are altogether nominal. *Sheet Zinc*.—We are now between seasons, and the demand is anything but a brisk one. We quote 9 by 36, 9½¢, gold, and the other sizes, 9¢. @

Antimony.—London is cabled £53. We are quiet here, with a light stock, and little on the way; the quotation is 12¼c. @ 12¼c.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending January 12, 1875:

Hardware.	
Anderson, Merchant & Co.	Files, chisels, 7
Baker, Hermann & Co.	Mdse. pkgs., 9
Blundin Bros.	Gun barrels, cs., 2
Blum & Co.	Wire rope, coils, 2
Bryce Wm. & Co.	Casks, 1
Fuesch A. & D.	Cases, 1
Friedmann & Lauterjung	Cutlery, cs., 2
Field A. & Co.	Cases, 24
Mdse. pkgs., 59	
King, Briggs & Co.	Chains, chis., 28
Laughland & Co.	Packages, 2
Wire, pkgs., 31	
Wm. F. Bailey & Co.	Cases, 19
Laus & Gariche.	Arms, cs., 2
Mdse. pkgs., 10	
Merchants Dispatch Co.	Arms, cs., 10
Mason John W. & Co.	Wire rope, coils, 1
Owen A.	Cutlery, cs., 1
Schoverling & Daly.	Arms, cs., 2
Mdse. pkgs., 5	
Tomey F. & Co.	Cases, 1
Van Wart & McCoy.	Mdse. pkgs., 19
Wheeler E. S. & Co.	Vices, chis., 5
Anville, 190	
Witte John G. & Bro.	Arms, cs., 1
Order.	
Cases, 690	
Nails, chis., 7	
Casks, 4	
Files, cs., 32	
Guns, cs., 10	

COAL.

The depression which has marked the Coal trade for several months past still continues. Affairs in the producing regions are in a very unsettled condition, and the suspension of mining operations has become almost general. Many dealers are fully stocked to meet all demands that may be made upon them for some time to come; others are too timid to make contracts which, from the treacherous condition of the trade, may prove ruinous. The Philadelphia & Reading Coal and Iron Company have announced a reduction in the price of Coal varying from fifty to sixty cents per ton, which will doubtless be at once followed by other producing companies.

The following are the reduction in prices of Coal, which have been announced by the Philadelphia & Reading Coal and Iron Company:

	Per ton.
On Steamboat Coal	55 cents.
Broken	55 "
" Egg	55 "
" Stove	55 "
" Chestnut	50 "

This is an important movement, and will greatly assist in adjusting the expenses of manufacturing to the changed condition of the times.

A letter written from Hazelton, Pa., under date of the 11th instant says: "The coal miners in this county and through the Lehigh region held a conference through their delegates with the representatives of the operators, and the former expressed great opposition to the wages offered on the circular issued by the operators from this place on the 31st ult., but many of the miners would gladly make a compromise. The inside men, who are working on contract work, might manage to earn a fair living at the prices proposed by the operators, provided they could have steady work and the coal be sold at present rates in the market; but the wages offered the outside laborers is too low, considering the present price of provisions and the time that these men are obliged to remain idle from various causes each month. The mines around here, with the exception of one or two that are leased by the 'small fry' outside the combination of big operators, have been standing idle since the first of this month. This has been arranged to allow the miners time to consider the operators' proposal of wages for this year, and possibly for deeper reasons."

The following is a correct copy of the offer made by the operators:

Resolved, That the operators of the Lehigh region offer to their men the following rates of wages for 1875, viz: For outside labor or a fixed rate for the year of \$8 to \$9 per week; platform labor, \$9.00 per week; boys and slate pickers ten per cent. of the wages for 1874. When the price of coal is \$5 per ton on board at Elizabethport or Port Johnson, for inside labor \$9.00 to \$10.00 per week; miners' wages by the day, \$12.00 per week; for cutting coal, fifteen per cent. off the price of 1874 for similar work. When extra allowances are to be made the price shall be ascertained by reducing the price paid in 1874 for work of a similar character fifteen per cent. The above wages, except for outside labor, shall advance or decline at the rate of ten per cent. for every dollar or fraction of a dollar advance or decline in the price of coal at Elizabethport or Port Johnson, as fixed monthly by the Lehigh Coal Exchange of New York.

Resolved, That when work at the mines is resumed, it shall be with the distinct understanding that if any difficulty as to the wages, or of any other nature, should arise between the operator and any of his employees, which cannot be arranged by the parties interested, that the difficulty shall be referred to a board of arbitrators for settlement, and pending their decision work shall not cease on account of said difficulty.

We quote as follows: Cumberland, \$6.50 @ \$6.75; West Virginia, \$7.25; James River Steam, \$6.25; James River Carbonite, \$9; Kanawha House, \$14.25; American Canal, \$13; Pennsylvania and Westmoreland, \$7.65; Murphy Run, \$7.40; Newburg Orrel, \$7.50; Sterling Ohio, \$12; Liverpool House Canal, \$8; Liverpool Gas, \$11; Newcastle Gas, \$7.30 @ \$8; Scotch, \$8; Leith Hall, \$17 @ \$18. The Coal transported over the Cumberland Branch Railroad during the 9 days ending Jan. 9, 1875, amounted to 856 tons, as against 2425 tons shipped in the corresponding period of last year, showing a decrease of 2569 tons. Over the Cumberland & Pennsylvania Railroad, for the same period, the ship-

ments were 19,805 tons, against 26,275 tons shipped in 1874, a decrease of 6390 tons. The aggregate amount of Cumberland Coal shipped by the various companies during the last 9 days amounted to 23,025 tons.

OLD METALS, PAPER STOCK, &c.

Nothing of importance has occurred in the market for Old Metals, Paper Stock and other junk materials during the period that has elapsed since the date of our last. There has been a slight call for some articles, but as a whole the market is extremely dull. The only change we have to note is in the market for Old Lead, which has a declining tendency, and buyers cannot be induced to purchase any considerable quantity. We quote the following as the current purchasing rates:

Old Metals.—Copper, 10c. @ 17c. per lb.; Yellow Metal, 11c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tin Lead, 4c.; Zinc, 4½c. @ 4½c.; Pewter, No. 1, 18c.; do., No. 2, 8c. @ 12c.; Spelter, No. 1, 5½c.; Wrought Iron, 1½c.; Sheet do., ½c.; Cast, do., ½c.; Machinery, do., ½c.; Rags, &c.—Canvas, Linen, 5c. @ 5½c.; do. Cotton, No. 1, 6c. @ 6½c.; No. 2, 2½c.; White, No. 1, 6c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 4½c. @ 5c.; Gummi, Bagging, 1c.; Jute Butts, 1½c.; 3c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1½c.; Kettles, Bale Rope, 4c.; Oakum Junk, No. 1, 4½c. @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1½c.; Grass Rope, 2½c. @ 2½c.

PHILADELPHIA.

PHILADELPHIA, Jan. 12, 1875.

While there has been no especial improvement of importance to note in the situation of the iron market here, there is a decidedly firmer feeling among holders and producers of Pig metal, and an increased inquiry for most grades of raw material, new and old, Bars alone continuing depressed and neglected. A portion of the slight improvement in Pig metal may be attributed to fears of a prolonged Coal strike, but the greater part is undoubtedly due to the fact that both producers and consumers have accepted the belief that the bottom has been touched, and from this on prices must advance. Business has been considerably interfered with by the excitement of the political situation, and actual transactions curtailed by the annual meetings of most of the railroad and transportation companies centering here. In Manufactured Irons an improved feeling is noticeable in Rails, and it is believed that both the Northern Pacific and the Texas and Pacific Companies have a fair prospect of receiving aid from Congress during the present session, which will, if granted, create a demand from these roads for considerable demands of track material and equipment. Old Rails and Scrap are both in better request, and the latter comparatively scarce and slightly higher in price. Bars continue dull, and prices are hard to quote, ranging from 28, nominally, down to 23 cents per pound in some actual sales. Charcoal Irons are entirely neglected, and even the best brands of Wheel Irons unsought. Old Wheels, on the contrary, are more active, and some transactions are noted, with also a fair demand for Muck Bar. In Steel Rails we hear of no sales to note. We quote:

Pig Iron.—No. 1 Foundry, \$26, stiff; No. 2, \$24. Gray Forge \$21 to \$23, the former at furnaces.

Bars.—2½c. to 2½c. per lb. Old Rails.—\$28 to \$29. Scrap.—\$29 to \$30 for No. 1 Wrought, as to selections.

The sales include some 4000 tons of Nos. 1 and 2 Foundries, at quotations; 1200 tons of Gray Forge at \$21, at furnace; and smaller lots at \$23, here. Rails, 3000 tons from Western mills, at \$52.50, and 500 tons Old Rails, at \$29, spot. Small lots of Wrought Scrap at quotations, and 1000 tons of Old Wheels at \$24, here. The market closes firmer, and with a more hopeful feeling among all parties.

PITTSBURGH.

PITTSBURGH, Jan. 11, 1875.

Pig Iron.—There has been some little movement in Pig Iron within the past week, but as anticipated by the market, the present condition of affairs, at a lower range of prices. Some of the mills have been buying, not that they needed it, as the lock-out is still in full force, but because it is cheap, and they consider it good property at the prices at which it was offered. Your correspondent is reliably informed that some of the furnaces here have sold good Mill Iron at \$21, cash, and \$22, 4 months, which, it is said, is better than it was before the war, and some well informed operators appear to be impressed with the belief that the market has at last, if not altogether, touched bottom. At \$20, cash, there is no question but what a considerable quantity of Pig could be disposed of, as manufacturers generally would anticipate future wants at the price named; but, so far as I can learn, there are no sellers at this price to which reference has just been made. I was informed by a party, within the past day or two, that he had been on the look out for some \$20 (cash) Pig, but up to that time he had been unable to find anyone willing to sell; even at \$21, cash and \$22, 4 months, there are not many sellers as yet, as producers generally are still asking \$23 and \$24, cash and time, but it would be just as easy to buy at \$20, cash, perhaps easier, as it would be, in the present condition of affairs, to sell at \$23, cash. The mills, as matters now stand, with their puddling furnaces idle, have no immediate use for the raw article, and they are buying only such lots as are being offered at very low rates, impressed with the belief that, when they all start up again, the market may stiffen up, and there is no question but that event there will be those who are repressed with the belief that in no event is \$20, cash, likely to go much, if any, below \$20 @ \$21, and only those who are so situated financially as to be forced to realize, are selling at the low rates. The receipts continue light, and the most of the Pig coming forward is going into yard, and while the supply in the hands of the mills is lighter probably than it has been for years, there never was, perhaps, as much in the yards of the commission merchants at any one time as at present.

MANUFACTURED IRON.—There has been no improvement in the demand for Finished Iron during the past week, nor was it to be expected. The inquiry, as a rule, is for small lots to meet

immediate necessities, but it is probable orders will commence to come in more freely about the latter part of the month. Prices are pretty well sustained, and in not a few instances orders are being refused at prices which afford no margin for profit, and then the fact that the production has been considerably curtailed recently, has not been without its effect in stimulating the market. Quotations, that is for assorted orders, may be given on a basis of 2-25c. @ 2-30c. for Merchant Bars.

NAILS.—The Nail trade continues dull, as it usually is at this particular time, but it is hoped and expected that orders will commence coming forward pretty freely within the next week or two; at present, however, some of the factories have stopped, while others are only running part of the time, and that, too, with reduced force. Prices weak, but unchanged; \$3-12½ @ \$3-15, 60 days.

SCRAP IRON.—The demand is not as brisk as it was a few weeks since, as some of the mills have stopped to take stock and make repairs, and those that have not done so already will do so very soon; hence, what inquiry there is is confined mainly to supplying immediate wants, and prices, although steady, remain unchanged. Stocks in hands of dealers comparatively light.

MUCK BAR.—There is a fair demand, and sales of 1500 to 2000 tons have been reported recently at prices ranging from \$40 to \$43, 4 months. Until the lock-out is a thing of the past, some of the mills will have to buy considerable muck bar, as they will not turn away any of their customers if they can help it.

THE LOCK-OUT.—The general situation remains unchanged, manufacturers generally appear determined not to start up their puddling furnaces until the puddlers are satisfied to accept the reduction, and the puddlers are apparently as obstinate as the manufacturers. The matter may be settled in a week, and it may continue as it is for months. Some of the mills are in operation, except the puddling departments, working at scrap and muck bar, while others have stopped to take stock and make repairs.

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report on the following date, under date of Jan. 12: Trade has somewhat improved during the past week, and doubtless would be more marked but for the extraordinary cold weather that has prevailed for the past few days. We quote the list unchanged, and market improving.

AMERICAN REFINED BAR IRON.
1 to 6 wide by ½ to 1 thick, 2-7 to 3 cts. per lb.
Round and square, ordinary sizes, from ½ to 2 inclusive, 2-7 to 3 cts. per lb.
Roof Iron, 1½ wide and upward, 4½ to 4½c. per lb.
Horse Shoe Iron, 1½ wide, 3½ to 4½c. per lb.
Horse Shoe Iron, 1 to 1½ wide by ½ to 1 thick, 4½ to 5c. per lb.
Norway Nail Rods, 7½ to 8½c. per lb.
Black Diamond Cast Steel, Flats, Squares, 11½c. per lb.
Machinery Steel, 11½c. per lb.
Cast Spring Steel, 10½c. per lb.
Homogeneous Steel Plate, 13c. per lb.
Perkins' Horse Shoes, per keg of 100 lbs., \$8.75
Mule Shoes, 6-8½c. per lb.
Common Horse Nails, from 14c. to 18c. per pound.
Putnam Horse Nails, 23 24 25 26 28c. per lb.
R. R. Spikes, 5½ by 9-16 at 3½c. to 4c. per lb.

Messrs. HOFFMAN, THOMPSON & Co., Iron commission merchants, 23 and 25 South Frederick street, under date of Jan. 11, report the Pig Iron market as follows: The same inactivity prevails in the Iron market, and no change in prices. We quote:

Baltimore Charcoal Pig Iron \$27.00 @ 28.00—4 mos.

Virginia " " 30.00 @ 35.00—4 mos.

Alabama " " 25.00 @ 30.00—4 mos.

Anthracite No. 1 " 27.00 @ 28.00—4 mos.

No. 2 " 25.00 @ 26.00—4 mos.

No. 3 " 23.00 @ 24.00—4 mos.

White and Mottled " 17.00 @ 20.00—4 mos.

CINCINNATI.

Messrs. L. R. HULL & Co., under date of Jan. 11, write us as follows: Pig Iron.—The market continues about as reported last week. There have been exceptional sales for present and future delivery in round lots, but the larger number of buyers are still delaying their purchases. The trustees of the Cincinnati Southern Railroad have advertised for proposals for 25,000 tons of Railroad Iron and 22,000 tons of Steel Rails, bids to be opened Monday, Feb. 1, at 12 o'clock, noon, at No. 70 West Third street. We revise our quotations:

Hanging Rock No. 1, 27.00 @ 28.00—4 mos.

Tennessee No. 1, 26.00 @ 27.00—4 mos.

Alabama No. 1, 25.00 @ 26.00—4 mos.

Missouri No. 1, 24.00 @ 25.00—4 mos.

Ohio No. 1, 23.00 @ 24.00—4 mos.

Scotch Pig No. 1, 22.00 @ 23.00—4 mos.

COLD BLAST CHARCOAL.

Hanging Rock Car Wheel \$4.50 @ 5.00—4 mos.

Missouri " " 4.00 @ 4.50—4 mos.

Kentucky " " 4.00 @ 4.50—4 mos.

Tennessee " " 3.50 @ 4.00—4 mos.

Alabama " " 4.00 @ 4.50—4 mos.

Machinery and Forge " 4.00 @ 4.50—4 mos.

Bloomers " " 7.00 @ 9.00—4 mos.

BOSTON.

BOSTON, Jan. 9.—Pig is very dull, and round lots could likely be found on our wharves at \$27, cash, for No. 1, and \$24.50 for No. 2. The reports from Hoboken are of the same vacillating character which has marked the business at that point since the middle of December, and credited rumor points to offers to ship 100 tons of No. 1 reliable brands at \$24, and \$22.25 for No. 2. In Gray Forge there is very little doing, but lots here are apparently strong at \$20, while nothing is now known at shipping points for less than \$18, fully \$2 better than the lowest point a week ago. Bar is a trifle steadier, and common Iron is rather firm for 2½c., though odd lots of assorted sizes are quoting down to 2½c. on the average is, say, equal to 1½c. improvement on last week's prices. Refined Iron is strong at 2½c. to 2½c., the inside quotation being for large lots. This turn to the market seems to result from the fact that most of the low selling houses are well cleaned out and cannot replenish at their previous selling rate, while one or two houses holding large lots, unwilling to let values shift back to the relative cost to land here, still sell at a loss to secure a depletion of stock. Steel is in fair request. The demand for agricultural tools being very fair, we note sales direct from the West of 80 tons shovel steel, private terms, while several large orders for barrow teeth have been placed at Pittsburgh. In machinery Steel a small jobbing demand has started. We quote machinery, 9½c. to 10c.; American Tool, 15c. to 15½c.; English Tool, 17c. Copper continues quiet and firm for spot at 15½c., and futures at 23½c. Reports from London show a decline of 10, a ton on Tuesday, but a reaction of 5 was had on Friday, the market closing there, Bull, and Braziers, 30c. to 31c.; Yellow Metal Bolts,

25c. to 26c. Lead is easy at a decline of about ½c. for the week. We quote domestic, 6½c.; gold; foreign, ½c. higher. Sheet and Pipe, 8½c.; currency; Tin-lined Pipe, 16½c.; Bar Lead, 8½c., less usual trade or 10 per cent. discount. Spelter is dull at a decline of 4c.; American at 6½c., currency. Tin is strong and a trifle higher under the influence of foreign speculators, which quote in London, Singapore, 25; English Refined, £105, and in Straits, 25 florins per picul. We quote 22½c. for spot Straits and 22½c. to 22½c. to arrive. Refined English is firm for 22c., gold. Plates are firm; we quote Charcoal I. C., \$11.25 to \$12.50; Coke, \$9 to \$10; and Tene at \$8.50 to \$12.50 per box, currency.—Commercial Bulletin.

LOUISVILLE.

Mr. GEO. H. HULL, under date of Jan. 11, writes us as follows: The market is dull and lower. We revise quotations as below. The usual time, four months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 Fdry, from Hanging Rock \$25.00 @ 28.00

" " " " 24.00 @ 25.00

" 1 Forge, " " 23.00 @ 24.00

" 2 Fdry, from Tennessee Ores, 23.00 @ 25.00

" " " " 24.00 @ 25.00

" 1 Forge, " " 23.00 @ 24.00

" 2 Fdry, from Alabama Ores, 25.00 @ 28.00

" 1 " " " " 25.00 @ 28.00

" 1 Fdry, from Missouri Ores, 28.00 @ 30.00

" 1 Forge, " " 27.00 @ 28.00

" " " " 25.00 @ 27.00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores, 40.00 @ 50.00

" " " " 35.00 @ 38.00

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Messrs. James Watson & Co., Dec. 26: "Our market for Scotch pig iron has been flat this week, with a considerable drop in prices, business in warrants from \$2.9 to 78.6, cash, closing to-day nominally at 79.6. Shipments last week were 7324 tons against 9156 tons in the corresponding week of 1873."

	No. 1.	No. 3.
G. M. B. at Glasgow	84	80.6
W. B. at Glasgow	83	81.6
Coltman	83	81.6
Sumner	83	81.6
Langdon	83	81.6
Carbroe	83	81.6
Calder, at Port Dundas	91	80.6
Cleghorn, at Ardrossan	91	80.6
Eglinton	82	79
Dumfries	84	80
Shotts, at Leith	84	80
Kinnell, at Boness	88	78

TRADES OF SHEFFIELD.

The movement for reducing wages and extending hours of labor is daily spreading, and will very shortly be applied to almost every branch of trade. At several of the principal iron and steel works the change is taking the form of an attempt to substitute fifty-nine working hours per week for the fifty-four at present generally adopted. As a reason for making this attempt, it is put forward that since the fifty-four plan came into operation there has been less work done in proportion than before, and not only so, but that the men have made less time on the average. Figures are forthcoming to show that both these effects have resulted, and that it is, therefore, desirable to go back to the system which was in operation prior to the agitation of the Newcastle engineers in 1871. At the Atlas Works (John Brown & Co., Limited) this extension of time will be put in force in several departments on and after January 4th, 1875. From that date the time of the laborers in the stock, spring, carriage, north force, rail mills, tire mills and hammer shops will be fifty-nine hours per week. At the same establishment the wages of the engine tenders, hammer drivers and roller fitters will be reduced 10 per cent., and a similar drop will be enforced in the case of the laborers employed in the engineers' buffer foundry and planing departments. The tire men of the same firm have agreed to resume work at a drop of 12½ per cent., instead of 20 per cent., as at first proposed by the employers. At the Crucible & Siemens Steel Works, of Messrs. Vickers, Sons & Company, Limited, Brightside, wages have been reduced, and the working time has been extended to 59 hours per week. The men employed by the Phoenix Bessemer Steel Company, at the Ickles, near Rotherham, have agreed to continue at work at a reduction in wages of 15 per cent. At the Donfield Bessemer Steel Works, of Messrs. Wilson & Cammell, the men have consented to the drop of 10 per cent. About forty spring smiths, employed by Messrs. Brown, Bayley & Dixon, Limited, Sheffield Steel and Iron Works, have turned out on strike in consequence of an attempt having been made to reduce their rate of pay about 20 per cent. A number of spring strikers are also "out" at the Sheffield Works of Thomas Turner & Sons. In both the last mentioned cases the men are being supported by the trades union. Messrs. Henry Bessemer & Company are stated to have given notice of a reduction to their workmen, most of whom are now idle, and are likely to remain so until after Christmas. The Albion Steel and Wire Company have given the whole of their workmen fourteen days' notice, but with an appended intimation that fresh engagements would be offered to them at the end of that period. Messrs. Charles Cammell & Company, Limited, have informed all their engineers that they will be required to go on laborers' wages until work is resumed after the holidays, or their services can be wholly dispensed with if they do not see fit to fall in with the proposition. The pay is ordinarily 30 to 32 per week, but as laborers the men would only be entitled to receive 21. The average of 20 men in their armor plate planing shops, probably owing to the recent introduction of a very powerful planing machine, Messrs. Thomas Firth & Sons, the well known cast steel and ordnance manufacturers, are about to reduce the wages of all their steel millers about 2½ per week. Messrs. Wilson Hawksworth, Ellison & Co., Carlisle Works, have given notice of an enlargement of working time from 54 to 59 hours per week. Messrs. G. J. Brown, Limited, Rotherham Iron Works, have given 150 men notice to leave their employment on December 31st. In addition to these, other notices are in preparation, and will be served as soon as it is clear what course the men will take. Generally speaking, it appears tolerably certain that they have no valid objection to reduced wages, providing there is a general movement in that direction. In some quarters it is believed they will resist the action of the employers in this respect, but it hardly appears, as yet, that there is any such disposition openly manifested.

In the rail trade there is very little doing, although at one or two local mills there are orders on hand which will take a couple of months or so to work through. New favors are, nevertheless, entirely absent from the books, although it cannot be denied that there are inquiries in the market which ought, in the ordinary way, to be placed here, but will now probably go either into Wales or Belgium.

There is very little inquiry for railway springs, but there are better prospects for this department next year. In merchant iron next to nothing is being done, and prices are consequently rather weaker. Quotations are expected to go down to a fully 21 per ton as soon as the various quarterly meetings are over, as it is felt that a reduction is absolutely needed in order to give a stimulus to trade.

The engineering establishments are quieter now than they have been for a long time. Orders for colliery plant and iron works machinery, which were given a year or more back, have been got through, and their places are not being filled with orders of anything like the same size or in the same numbers.

There is no change in the coal trade—house coal is well upheld in price, but steam coal is weaker to the extent of about 1½ per ton. It is now on offer at 12 to 12½ per ton at the pits. Engine coal does not sell at all well, and is lower in price.

In the cutlery trades the holidays will be of long duration owing to the slackness of trade. Blade makers are doing a very brisk business indeed. The breakage of a tire on the Great Western Railway with such dire results (as alluded to in a preceding paragraph), has very naturally created a good deal of interest here, seeing that most of the tires for railway carriages are produced at Sheffield. The editor of the Sheffield Telegraph, who is not wholly without inspiration on the subject from a very high practical source, thus speaks of it: "Now, what is a railway wheel tire? It is the circular shaped Bessemer ring, which is made with a flange, and is put on the wheel at a white heat to bind itself as it cools by contraction. Thousands of such tires are made in Sheffield and its neighborhood, as well as in the other iron-working districts of England, and very beautiful is the process by which the glowing lump of steel is made to open in the center and gradually spin itself out to the full dimensions and the perfect form of a finished tire. There is no fuss and no confusion. Under intense pressure the future tire revolves as it lies, widening from a Cheshire cheese shaped ingot of malleable steel to the precise form of

flanged hoop required. The dreadful accident we report to-day is by no means the first we have had to report from the breaking of tires. We remember other instances, and we remember, too, that this special kind of danger appears to have prevailed most in times of severe frost. Does not extreme cold add to the brittleness of the metal employed for tires, and is not the present accident an argument for the adoption of some standard of strength, if not of some authoritative test? The peril from tires has increased with the increase of fast trains, and unless it be diminished, it will tend to deter the cautious and the timid from traveling by railway during periods of hard frost. The danger is not likely to decrease by being left to itself. The making of tires was at one time a lucrative business, but it has ceased to be so now. New makers have crowded into the business, the pressure of competition has told upon the prices, and during the depressed state of the iron trade generally the temptation grows to underbid for the sake of orders. We hear of railway companies that accept as spring steel made from the best brands of Swedish iron, an article offered for less money than Swedish iron of the best brands costs before it is converted into steel. In cases of this kind the manufacturer must either risk his own ruin, or he must risk the safety of the traveling public; and, inasmuch as self-preservation is the first law of Nature, we may take it for granted that he plucks the quality and leaves the public to the care of Providence. In times of depression there is a good deal of temptation on both sides. The great buyers are tempted to take advantage of the straits to which the weaker producers are driven, and such producers are in turn tempted in self defense to employ their wit in outwitting the buyers."

SOUTH STAFFORDSHIRE AND BIRMINGHAM.

In neither of these districts does the state of trade call for any special remark—the beer house keepers being at present most busily engaged. In the iron trade operations are wholly suspended, and will probably remain so until January 3d or 4th.

SOUTH WALES.

is also dull in all directions. The iron works have no orders on hand, and the coal trade is threatened with a strike on a very grave scale indeed. Tin plates sell pretty well.

METAL MARKETS.

These are also closed. Up to the suspension of business on Thursday noon the course of sales was fairly quiet but steady. Messrs. Vivian, Younger and Bond, say:

"Notwithstanding the approach of the holidays there has been a fair amount of business during the past week in some metals. Copper.—On the 19th inst. advices were received from Chili that the charters for the first half of December were equal to 2700 tons fine copper, and prices became rather easier; but some purchases of good ordinary brands having been made at about £85. 10, the market became firmer, until the 22d, when the usual cablegram from Chili advices was received, announcing the charters for all November as 5000 tons fine copper, being 2000 tons for the second half of that month, instead of 1300 tons as had been reported. These very large charters from Chili during the last three months begin to attract considerable attention, and seem to point to an accumulation of stocks on that side of somewhat alarming proportions. Since early in October, when they should have heard in Chili of the price of about £80, the total charters, say for three months, amount to about 14,500 tons. It is thought by some that these charters may be made for shipment over an unusually long time, but as the actual shipments in November were advised as 5000 tons, it cannot be said this view is confirmed. Beyond some speculative purchases, the trade for the week has been exceedingly dull. In furnace stuff 1069 tons of ore were sold at the Swansea ticketing yesterday. The average price of 16 1/2 for an average produce of 25½ per cent. Unmanufactured copper continues very irregular in price, and the demand is only moderate. Manufactured also remains inactive. Yellow metal is obtainable at rather lower prices, and there is very little demand for export. Tin.—There has been a gradual improvement in the price of this metal since our last, and a fair quantity of Straits and Australian has changed hands at £42. 10 to arrive to £44 for spot parcels, for the former, and £42. 10 to £43, cash, for the latter. Yesterday a large lot, about 150 tons, was purchased, Straits at £43 to £43. 10 for arrival, and £44 spot, and Australian at £42. 10 and £43. English tin has been in moderate request, and sales have been made at £47 to £48 for common ingot, but £48 to £49 are now the current rates, and only small quantities could be obtained at the former price. Tin Plates.—Makers generally having now plenty of orders, are holding for higher prices, which buyers are not yet willing to pay. Iron.—Buyers of marked iron are only giving out orders now subject to any reduction next quarter-day, when it is anticipated that prices must be reduced. Spelter continues steady. Lead scarcely so firm.

The Mining Journal remarks: "Copper.—Owing to the announcement of heavy charters, which for the month of November are estimated at 5000 tons, and 2700 tons for the first half of December, the market has assumed a quiet appearance, and prices of Chili bars have dropped to £38 to £44. Sellers are not to be found, as a rule, below £44, and that in very small quantities. Although charters are heavy, yet being chiefly by sailing vessels, the arrivals may be still distant, and the expected supplies will not be forthcoming for some months; consequently stocks are likely to be light, and any extra demand would cause a diminution, and while this is the case prices will not probably recede, but may possibly advance. Lead.—This market is quiet, but firm, and sellers are not disposed to submit to any concession in the face of the reduced production, which amounts in the last two years to several thousands of tons. Spelter.—There have been sales at our ports of Silesian at £23. 17 1/2, and £24 is asked for spot parcels. Quicksilver.—£24 has been accepted. Market very quiet. Tin.—Prices are improving, and a little speculative movement is observable: £44. 10 has been paid for Straits, and £43 for Australian, cash terms. Tin Plates.—The market is firm, and as orders are coming in pretty fast, buyers should not defer making their purchases, or they may have to pay higher prices. L. C. coke, 27 1/2."

The following figures show how very considerably the production of lead and silver in the United Kingdom has fallen off during the past twenty years or so. In 1855 the quantity of lead ore raised in the United Kingdom was 99,300 tons, and which yielded 561,000 ounces of silver, while in 1873 the output of ore was only 73,500 tons, giving 524,307 ounces of silver. In 1867 and 1873 the figures were these:

	1867.		1873.	
	Lead ore, Silver.	Lead ore, Silver.	Lead ore, Silver.	Lead ore, Silver.
	Tons. Ozs.	Tons. Ozs.	Tons. Ozs.	Tons. Ozs.
Cornwall	8,645	314,326	3,893	129,519
Devonshire	863	33,719	670	6,510
Somersetshire	884	1,700	752	4,442
Derbyshire	4,917	1,900	4,442	750
Staffordshire	83	—	74	—
Lancashire	630	2,060	—	—
Shropshire	4,506	—	7,288	2,400
Yorkshire	7,539	3,000	4,986	1,500
Cumberland	5,693	31,022	2,435	16,175
Westmoreland	24,142	1,530	14,853	—
Durham & Northumb.	22,774	17,778	18,623	47,869
Total	88,742	499,617	44,708	212,856

Bigelow & Johnston's Annual Review of the Market for Iron and Steel Rails, Old Rails, Scrap and Pig Iron, 1874.

It is with much regret that in making our usual report on the state of our iron market here, we are unable to record anything satisfactory regarding the trade of 1874. It is probable that never in the history of the trade, certainly not for very many years, has a darker cloud rested over its prospects than now. One year ago the country had barely recovered from the stunning blow inflicted by the panic of the previous September, and it was yet difficult to predict what would be the ultimate effects on the business of 1874.

With something that was hopeful, there was yet sufficient to justify considerable doubt and forboding, and in the light of subsequent experience, it must be admitted that the full power and extent of the financial crisis, so far as concerned the iron trade, were not then fully comprehended. The severest blow was felt in the total credit which befell nearly all railroad securities, ruling out of the market all new and unfinished roads, and so shrinking the earnings of even old and prosperous concerns, as to withdraw from the market the support of the normal expenditures for repairs, &c., in some cases from positive necessity, and in others from severe measures of economy. As for those enterprises which were floating above the market, without as yet finding takers, they were as effectually squelched as if they had never been heard of. Under these circumstances, therefore, it will of course be expected that the construction of new roads will show a large deficit. According to the *Railway Gazette*—a very accurate authority—the mileage reported for 1874 is 1923 against 3883 miles in 1873, and 7190 miles in 1872. This, meagre, though it looks in comparison, is we think quite as much as could have been expected, and taking everything into consideration, a remarkably good record. It is for the most part made up of short lines and extensions, much of it narrow gauge.

The panic, however, though a potent cause of the depression which has ruled all through the past year, has not been the only one at work in the iron trade. Long before that calamity there were signs of exhaustion in the supply of capital, without which it was impossible to carry out the numerous projects so profusely offered. Investors, both at home and abroad, had apparently used up both their ability and inclination, and for many months it had been almost impossible to place the bonds of the most promising schemes. Then, in addition to the great wave which had swept prices in Europe to so high a pitch, had begun to recede, and lock-out on the part of employers to enforce a reduction in wages, took the place of strikes for an advance, and a general subsidence of the demand for iron all over the civilized world, gave warning that we were about to enter again a transition state, but this time from high to lower prices, always a more painful and difficult road to travel, than the reverse form. The stimulus of high prices, moreover, caused an enormous extension of our capacity for production, both of raw and manufactured iron, with its accompanying keen competition, so that even with a continuance of the prosperity which had existed for several years before the panic, we were in a position to meet at home nearly all the demands likely to be made on us, if we worked our capacity up to its fullest limit. Looking back therefore on the stormy path of the past twelve months—at the profound depression and tremendous shrinkage in values—we have reason to congratulate the trade on one thing, that so few failures have occurred, and that we have such valid evidence of the inherent soundness of the trade generally.

At the same time it would be folly to shut our eyes to the fact that a serious crisis is imminent, and that the burden has been borne hitherto, there is a limit to the ability of the broadest back, and it is an open question how long the present strain can be sustained without entailing very serious disaster. A very general expectation prevails that with the advent of spring we will witness a revival of all the dormant industries of the country. No doubt in this, as in all similar cases, "the wheel will turn, and the heavy burden will be a little difficult to define precisely on what basis these expectations rest, that would not have applied with equal force to the fall trade of 1874, which proved so disappointing. What is needed most of all is confidence, and that will be lacking so long as the air is filled with rumors of defaults, foreclosures and protests, in connection with the railroad business. But for that there would be enough of demand to supply all our mills with work for some time to come. Prices are at a low point, and there has not been for many years so favorable an opportunity for constructing roads cheaply as the present, the difference in the mere cost of iron of 50 lbs. per yard to the mile of road being about \$2500, other accessories and equipments being reduced in proportion. This great change in consumers' favor must ere long begin to have its influence, as capitalists who now shrink from investing further in uncompleted schemes must see that they will not soon have a more favorable chance for changing at a low cost a dead, into a living, active and profitable investment.

And yet recuperation may be a slow process, and liable to meet with hindrances from the financial discussions in Congress, the approach of another Presidential election, and the excitement of the Centenary celebration; beside this is not improbable, that having entered on a cycle of high priced years, we may be entering on a series of low ones, they in their turn to be followed by another upward reaction. But leaving the remote future to take care of itself, it is more pertinent to ask what remedy there is for present evils. Is the vast capital invested in blast furnaces and rolling mills to be looked upon as sunk beyond recall, or is there a way to extricate it from the web of difficulty in which it is now entangled?

Without doubt there must be, and we do not hesitate to say that it lies not in the galvanism of Congressional subsidies, nor in the unhealthy stimulus of railroads constructed by bartering the nation's credit. These may create a temporary activity, but only to be followed by greater depression, not to speak of the temptation to increase competition by adding to our productive capacity on this transitory and insecure basis. He would, indeed, be a wise man who could point out all the remedies for our present evils, but we suspect it rests more in a determination to reduce the cost of production than the changed aspect of the market can be met and grappled with. In combinations to curtail production we do not place much faith, for if failure will not take iron at one price, they are not likely to be induced by making it cost them more.

Another thing, we ought not to rest content until we have a foreign outlet for our surplus production of iron. In this grand safety valve in periods of depression lies much of the power of the European iron master, for it is a rare event when depression rules simultaneously in every market. As an illustration, we would direct attention to the export tables of Railroad iron shipped from Great Britain during the eleven months ending with November, 1874, as compared with the same period 1873, from which it will be seen that notwithstanding a deflection on the part of the United States as a customer

to the extent of 347,629 tons, the actual decrease to all countries is only 128,269 tons. Surely with the magnificent supply of ore and fuel in the possession of the United States, we ought to be able to furnish iron for the whole world, and not be content to lean exclusively on the home market, which however important as a rule, is, as we have lately seen, liable to desert us when we need it most. We are not forgetful of the barriers in the way to the attainment of so desirable an end. The conditions of labor, fuel and capital are undoubtedly very different here, as compared with Great Britain and other great centers of industry in Europe. These, in our opinion, however, are not insuperable difficulties, and as regards the first, have been in a measure nearly equalized. The money barrier will yield to time, but over against every impediment we are not afraid to place our superabundant natural resources of both coal and ores, and the skill and intelligence of our workmen. With these combined we ought to set all competition at defiance.

Of one thing we may rest assured that until we avail ourselves fully and intelligently of the great gifts of nature so lavishly bestowed, we must be content to hold a secondary position in this branch of the world's industry.

To revert, however, to that which practically concerns the immediate future, and ask the question that is on the lips of all interested in the iron trade, what are the prospects for 1875, from the present point of out-look? Will there be a revival of activity in spring, or are we destined to drag along in the same dull manner that has characterized the year just closed? It is certainly a difficult as well as important question, and the answers to it would vary according to the natural disposition of every one to whom the query is addressed. The hopeful say, yes, the despondent say no. The most experienced have been baffled, and hesitate now to express an opinion, but taking into consideration the fact that stocks of all kinds of iron in the hands of consumers are light, and that many of our railroads cannot much longer postpone their purchases, we cannot but think that brighter days are not far distant, and that there must be considerable revival of activity, even if it be not enough to advance prices materially. Indeed any attempt in this direction would be a disaster, and would be apt to check the incipient demand, beside inviting a renewal of foreign competition. It is to cheap iron we look for the inducement to capitalists to erect new buildings, finish half constructed railroads, and thus start anew the immense machinery directly and indirectly connected with such undertakings.

With these general remarks we will pass to a review of the particular articles generally embraced in our reports, and coming more exclusively within our own experience. Iron Rails.—No branch of the trade has suffered more than that devoted to the manufacture of Railway Iron. The panic fell on it with crushing effect, and many have had to contend not only with dull business and a continuously falling market, but have, in addition, been obliged to carry a load of dishonored railway obligations, nominally secured, it is true, but none the less burdensome. There has been no competition from abroad, as, unless it be on the Pacific Coast, we are not aware that a single bar of English Railroad iron has been imported into this country during 1874. Bessemer Steel Rails have been frequently reported as iron, and hence some misconception on this head. Of foreign made Rails in New York we started the year with a heavy stock, but this is now greatly reduced. The cheapness of these Rails, as compared with English prices, attracted considerable trade from Canada, and in this way we estimate that some 15,000 or 16,000 tons have been taken in bond, at prices ranging from \$33 to \$42, gold.

There is still a stock of somewhere about 16,000 tons, but as most of it is tied up by litigation, the quantity actually available is reduced to a few thousand tons of various sections and makes. It is doubtful if we can longer retain the Canadian business, as prices in England are now at a point that will attract the orders thither, in preference to picking up such miscellaneous parcels as are now left here. As regards the course of prices, it would serve little purpose to follow it in detail from month to month; suffice it to say that from January onward there has been a steady declension, as will be seen by a glance at our tables. Inquiries have not been lacking, but the larger portion have been unable to offer satisfactory security, and hence the amount of business actually accomplished has been limited. The steadily increasing demand for Steel Rails is also making great inroads into the manufacture of iron, and is likely to affect it still more.

We have endeavored to obtain, accurately, the production of our Rail mills for 1874, but have only been partially successful. We estimate it, however, at about 440,000 tons. The following are the quotations given monthly, representing, as nearly as was possible at the time, the current prices:

	1874.	1873.
January	\$56.00 to \$59.00	\$72.00
February	58.00 to 60.00	71.00
March	55.00 to 58.00	71.00
April	51.00 to 54.00	71.00
May	nominal	70.00
June	50.00 to 52.00	67.00
July	nominal	64.00
August	48.00 to 50.00	61.00
September	48.00 to 50.00	63.00
October	48.00 to 50.00	60.00
November	49.00 to 50.00	58.00
December	49.00 to 50.00	58.00

	1874.	1873.
January	\$29.00 to 30.00	\$27.50 to 28.00
February	30.00 to 32.00	30.00 to 32.00
March	30.00 to 32.00	30.00 to 32.00
April	30.00 to 32.00	30.00 to 32.00
May	30.00 to 32.00	30.00 to 32.00
June	30.00 to 32.00	30.00 to 32.00
July	30.00 to 32.00	30.00 to 32.00
August	30.00 to 32.00	30.00 to 32.00
September	30.00 to 32.00	30.00 to 32.00
October	30.00 to 32.00	30.00 to 32.00
November	30.00 to 32.00	30.00 to 32.00
December	30.00 to 32.00	30.00 to 32.00

STEEL RAILS.—These gain steadily in popularity and demand, though, of course, suffering from the same adverse influences as iron. Prices have been materially reduced, so that the best makes can now be purchased at considerably less than the cost of Iron Rails two years ago. Eight establishments are devoted to this manufacture, producing the past year about 100,000 tons, and there are one or two others still in course of construction, which will increase our capacity to about 300,000 tons. Our import from abroad has almost entirely ceased, and the total at this point for the year, foots up 68,529 tons, against 96,585 tons last year. With the present duty of \$25.20 per ton, our home makers are practically entrusted with a monopoly of our market, and no further import of English Bessemer Rails is likely to occur until our own mills are full of work, and a decided advance in price has taken place. The following rough estimate will show the present cost, of Foreign Steel, taking the first cost at say:

£10. 15. c. f. and t. at \$4.90	\$32.08
Duty	25.20
Premium on gold at 112½	9.74
Makes cost per ton	\$67.02 currency,

exclusive of commissions, interest, &c. As the competition on the part of American makers is great, to secure every desirable order at \$10 to

\$15 per ton below this, we may view the foreign trade in this article as, for the moment extinct. The following shows the monthly quotations:

	1874.	1873.
January	\$108.00 to 110.00	\$108.00 to 110.00
February	103.00 to 105.00	100.00 to 105.00
March	98.00 to 100.00	97.50 to 100.00
April	95.00 to 97.50	100.00 to 102.50
May	95.00 to 97.50	98.00 to 100.00
June	90.00 to 92.50	97.50 to 100.00
July	90.00 to 92.50	97.50 to 100.00
August	83.00 to 85.00	90.00 to 95.00
September	83.00 to 85.00	90.00 to 95.00
October	82.00 to 84.00	83.00 to 85.00
November	82.00 to 84.00	75.00 to 80.00
December	82.00 to 84.00	72.00 to 75.00

OLD RAILS.—These have now almost entirely ceased to attract any attention as an article of commerce on the part of importers. The depressed state of the trade in new Rails has, of course, proportionately reduced the call for old, but the fall in prices has been out of proportion to what has been witnessed in Forge Irons and other stock. The causes of this will be readily traced to the displacement of Iron by Steel, which has been the means of throwing out of the market large quantities of old Rails, utterly beyond our capacity to consume. The stock in this port is reduced to a few hundred tons held in second hands. We append the monthly quotations:

	1874.	1873.
January	\$40.00 to 42.00	\$36.00 to 38.00
February	42.00 to 44.00	36.00 to 38.00
March	39.00 to 41.00	35.00 to 37.00
April	38.00 to 40.00	32.00 to 34.00
May	36.00 to 38.00	30.00 to 32.00
June	35.00 to 37.00	29.00 to 31.00
July	36.00 to 37.00	26.00 to 28.00
August	34.00 to 36.00	26.00 to 28.00
September	31.00 to 33.00	23.00 to 25.00
October	30.00 to 32.00	23.00 to 25.00
November	29.00 to 31.00	23.00 to 25.00
December	26.50 to 27.00	28.00 to 30.00

SCRAP IRON.—The past year has been a trying one to all the dealers in this article. Pretty liberal stocks, carried over from last year, have been patiently held in the daily hope of a revival which never came. The market has been handicapped by a large quantity of Foreign Scrap of miscellaneous character. This has been partially disposed of, and when entirely cleared off, it is expected that the trade will assume a steadier appearance. The following have been the monthly prices:

	1874.	1873.
January	\$40.00 to 42.00	\$37.00 to 39.00
February	42.00 to 44.00	37.00 to 39.00
March	39.00 to 41.00	35.00 to 37.00
April	40.00 to 42.00	30.00 to 32.00
May	35.00 to 37.00	27.00 to 29.00
June	36.00 to 38.00	25.00 to 27.00
July	35.00 to 37.00	24.00 to 26.00
August	35.00 to 37.00	24.00 to 26.00
September	33.00 to 35.00	23.00 to 25.00
October	32.00 to 34.00	23.00 to 25.00
November	30.00 to 32.00	23.00 to 25.00
December	20.00 to 22.00	40.00 to 42.00

Pig Iron.—The year has been one of great disappointment, one continuous struggle on the part of producers to keep up prices at a paying point, while the ground has been sliding away from beneath their feet. The market has been overladen with stock for which there was but an attenuated and fitful demand, and where necessity compelled realization it has resulted in repeated downward surges in the price. Two years ago, when prices reached their maximum, a vast addition was made to the number of furnaces all over the country; new stacks were built and old ones refitted, with a view to reap the golden harvest. The ebbs of the tide have, however, been so rapid that many of these new concerns had barely got into blast when the blight of misfortune fell on them. The survey is to-day somewhat melancholy, and no better evidence is wanted of the severity of the collapse. It is generally conceded that prices have been pushed down below the limits of endurance, with the present scale of wages, coal, ore and transportation, and it has been seriously discussed, whether a general blowing out would not be better than the present dead-alive condition.

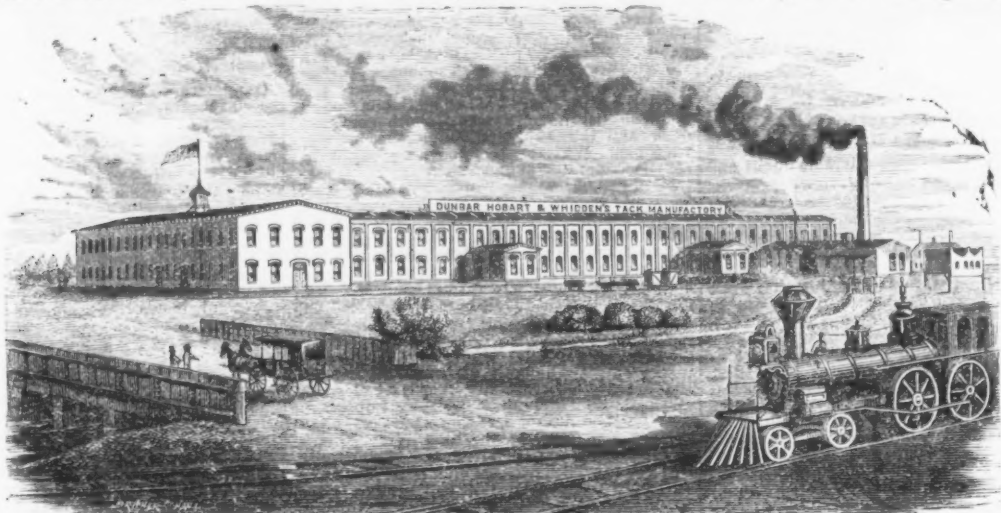
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Tinned, Leathered and Large Head Carpet Tacks, Finishing Nails, Black and Tinned Trunk Nails, Miners', Gimp, Lace and Brush Tacks, Hungarian, Chair, Cigar Box and Barrel Nails, Glaziers' Points,

IRON, STEEL, COPPER, ZINC AND BRASS SHOE NAILS,

Heel and Toe Plates, Steel Shanks, and Fancy Head Nails, Silver or Japanned Lining and Saddle Nails.

A full assortment always on hand at salesrooms, for immediate delivery if required. Odd and irregular sizes made to order or cut from sample at short notice. Send for Price List.

OLIVER'S Chilled Plows.



These implements in their present form, though but four years before the public, show the following remarkable record:

15,000	were sold in the season of 1871.
30,419	" " " " " 1872.
7,472	" " " " " 1873.
14,976	" " " " " 1874.

(Exclusive of sales in new territory), while for the season of 1875, the capacity of the works has been increased to turn out 30,000 plows complete.

The cause of this astounding result is that the **OLIVER'S CHILLED PLOWS** prove on trial to be all and more than we claim for them, on following points, viz:

- 1st. They are the lightest draft.
- 2nd. They are the most durable.
- 3rd. They are perfectly adjustable and have a center draft.
- 4th. They will scour in all kinds of soil.
- 5th. They are the cheapest plow used.
- 6th. They are the only chilled plows made.

Our first point is secured by the share and moldboard forming one continuous curve, thus compelling the soil to touch every part with equal firmness; the shape is easy and natural and abrupt angles do not exist, while our chilled iron possesses a peculiar smoothness and solidity throughout, far ahead of any other metal used in plows.

Our second point needs no explanation from us, as chilled iron is conceded by all to be the hardest and most durable metal used for this purpose.

Its temper is uniformly hard, and will not scratch nor corrode.

Our third point is secured by a movable beam, placed over the center of the work, which can be so nicely adjusted by moving to the right or left, that the plow will run without handling. With these plows the most uninteresting portion of farm labor becomes a pleasure and a pride.

Our fourth point is secured by the combination of our chilled metal, with the common sense shape of moldboard and share. Every part of the metal below the ground is subject to equal wear, leaving no portion untouched to which the soil can attach and clog the plow. The change from gravelly to prairie soil can be made with safety, as the metal is so hard that it cannot be scratched; hence, its peculiar smoothness is not disturbed, and scour it must.

Our fifth claim is easy to substantiate, for the draft of **OLIVER'S CHILLED PLOWS** will average fully twenty-five per cent. below that of all others, which means that, out of every four days' work with other plows, the labor of one day can be saved, by using

OLIVER'S CHILLED PLOWS, with the same amount of power expended. The great durability of these plows, consequent upon the extreme uniformity and hardness of the chilled metal, is another item to be considered in this connection.

Our chilled moldboards, after plowing one hundred acres, show a loss of weight of from four to seven ounces, depending on the soil in which they are used.

This result cannot be equaled, much less surpassed, by any other metal, or combination of metals, ever used in plows.

Our sixth claim we will not discuss here, but should it be disputed by any one, we shall be happy to convince the most skeptical of its truthfulness. Call on us for the proofs at any time, and we pledge our words they shall be produced.

We are the only manufacturers in the world that devote their entire capital, time and facilities to the production of plows, and the natural result is, perfection in the implement produced under such circumstances.

For full descriptive circulars explaining the merits of

OLIVER'S CHILLED PLOWS, or other information relative thereto, address,

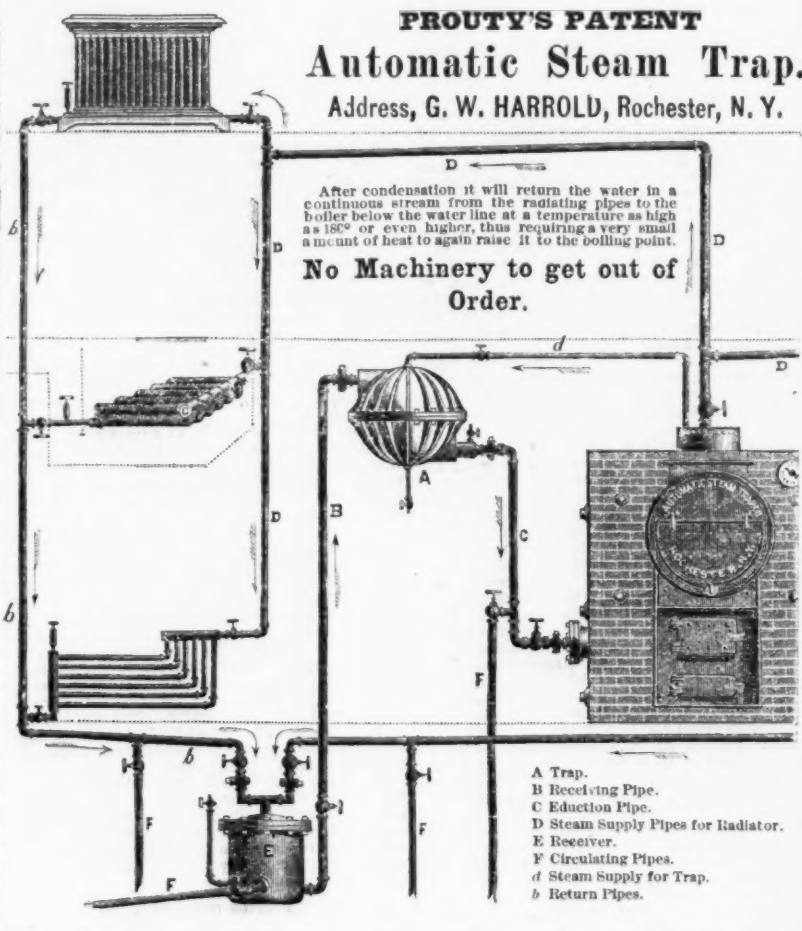
South Bend Iron Works,

SOUTH BEND, IND.

STEAM GOVERNOR

WARRANTED BEST IN USE.

ADDRESS: HUNTINGTON, CONNECTICUT, LAWRENCE, MASS.



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AND

Angular Extension

BORER.

Q. S. Backus,

SOLE MANUFACTURER OF
ANGULAR EXTENSION BORER.

Salesroom, 82 Chambers St., N. Y.

This tool can be used in any brace, at any angle, and also for straight work. Is the best and most convenient tool of its kind ever offered to the public. Eight thousand sold the first year.

Also Manufactures the Straight Extension

Backus's Pat. Improved Bit Brace.



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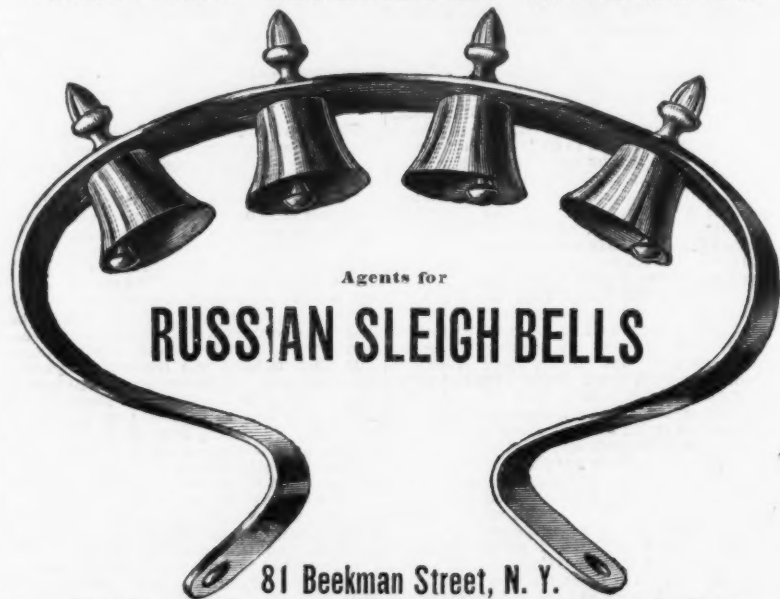
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MANUFACTURED FROM THE BEST ENGLISH EXTRA CAST STEEL BY THE JOHNSONVILLE AXE MFG. CO.

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TROY, N.Y.

J. CLARK WILSON & CO.,
American and Foreign
HARDWARE COMMISSION MERCHANTS.



These Bells are of a Fine Musical Tone, Very Stylish, and Easily Adjusted.

No.	Per doz.	No.	Per doz.
80. Polished Bells, Japanned Bow	\$30.00	84. Gold Plated Bells, Gold Plated Bow	\$30.00
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82. Silver Plated Bells, Silver Plated Bow	60.00	86. Polished Bells, Polished Bow	60.00
83. Gold Plated Bells, Silver Plated Bow	75.00	Discount 25 per cent.	

We have other styles of these Bells for single or double harness. Price List sent on application.

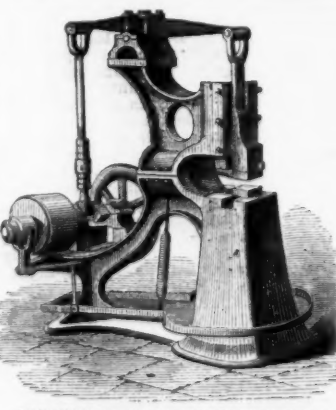
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The Common Wagon quickly and easily converted into a good spring wagon without change of construction. Five years' thorough test. Ten thousand sets in use, all sizes. Perfectly Successful, Light, Simple, Effective, Durable, Cheap. Splendid Sea and Pole Spring. Can't be broken. Don't fail to send for our circular.

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Of these Machines we are building sizes to meet the requirements of all Manufacturers and Workers of Iron and Steel. In simplicity, durability, ease of operation, accuracy, and range of work, we guarantee them superior to any Machines of their kind produced in the world. For prices, references, and full descriptive circulars, address

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BARBER RATCHET BRACE.

This Brace has a Lin-
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isweep, Malleable Iron

Cast Steel Jaws,
It is beautifully
MOST PERFECT

In places where there is not
will drive the bit in or out,
without the Ratchet attach-

Pawls and
finished, and in
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room to revolve the sweep, a
They cost only 50 cents more
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**WITH THIS
BRACKET SAW**

An infinite number of
useful and ornamental
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It will pay for itself
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The frame is 32 1/2 in.,
and made of red cherry
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For sale at all Hard-
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running Hand, Rose-
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slight back and forth motion
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This is the most powerful Cutter in use, and
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Weight, Cut, Price.
No. 1, 16 lbs., 3 1/2 in. or 4 in. round or sq., \$4.50
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Manufacture **Barber's Bit Braces, Miller's Falls Vises, Little Giant Iron Cutters**
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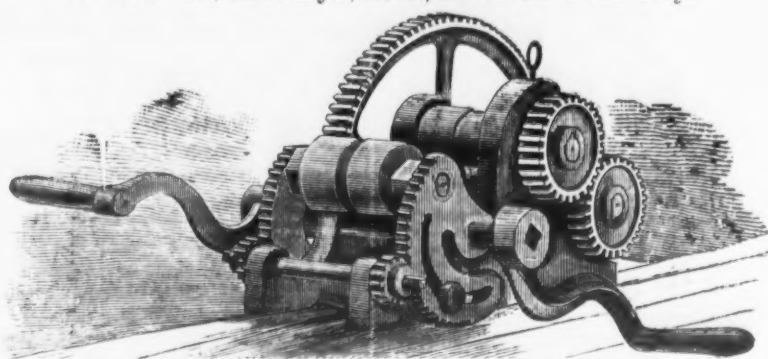
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Our Glass Cutters are made with a handle like a Glazier's
DI model, but, instead of the diamond point, they have
an all hardened steel revolving wheel, the sharp edge of
which cuts nearly as well as a diamond. They are durable
and will give entire satisfaction.

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Patented January 13, 1874.

This Machine is destined to supersede all Tire Benders now in use, especially for heavy work. The malleable
roller can be readily removed and replaced, thus allowing Tires to be withdrawn without difficulty after being bent.
Fifth Wheels and Tires never slip while being bent in this Machine. One man can bend a Tire 3x1 without
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DOOR KNOBS (Lava, Wooden, Porcelain & Mineral), **SHUTTER, PICTURE**
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Having consignment of one of the largest German manufacturers of **Halter and Coil Chains**
we can offer inducements on these goods.
We shall be pleased to send our new list at prices to those who will apply.



FOR MELTING ALL KINDS OF METALS.

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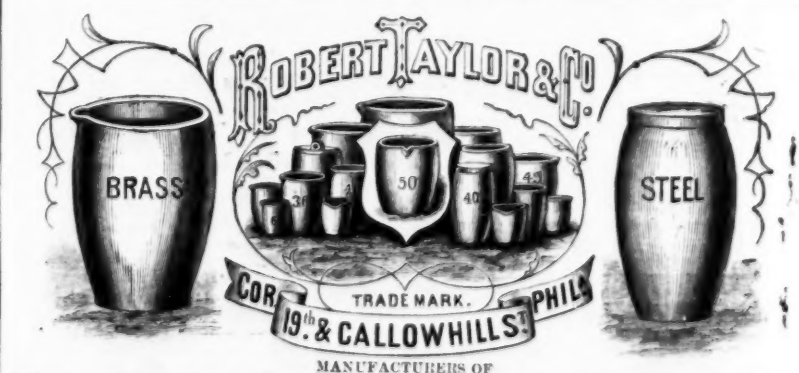
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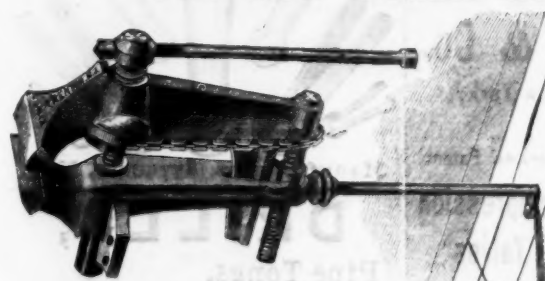
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NOTICE.

These Vises are only manufactured at the **HOWARD IRON WORKS, Buffalo, N. Y.** and are so stamped. The improvements in these Vises
which are patented are valuable, and parties who claim to manufacture, and are offering a Vise representing it to be the same as the **HOWARD VISE**
are deceiving the Trade.

The New Double Screw Parallel "Leg" Vise.

We are now ready to furnish, as the result of more than thirty years' experience, our
latest style of Vise—the best yet made. It is stronger than any other, whether of Foreign
or of American make; always parallel and holding with a tighter "grip." The jaws are of
convenient shape for the workman to get near his work equally well for filing or chipping
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mon "parallel" type, and which, depending upon slides alone for preserving parallelism, can
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Our New Vise combines all the advantages of the "Peter Wright" Leg Vise, of
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Even during the same general use, as the well known Chain Vise, so long made by us,
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The jaws are of best Tool Steel, welded on, file cut and properly hardened. The
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The lower screw maintains the parallel position of the two jaws, by having exact mo-
tion with the upper work piece, so that the connecting chain which results as it
The chain is very accurately made of steel links and rivets, and having no strain of
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Prices with Special Discounts to the Trade.

No. 1, Jaws 3 1/2 in. x 3/4 in. Screws 3/4 in. diameter. Lever 9 in. long. Opens 4 1/2 in.	28 00
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" 4, " 6 1/2 in. x 1 3/4 in. " 1 3/4 in. " " 17 in. "	" 40 00
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" 6, " 8 1/2 in. x 1 3/4 in. " 1 3/4 in. " " 21 in. "	" 48 00

All sizes of these Vises furnished with swivel Attachment, at an additional cost of \$1 to \$1.50. Sold at the General Agencies.

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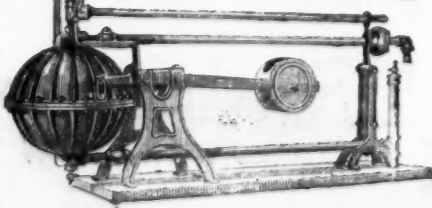
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This Trap automatically drains the water of
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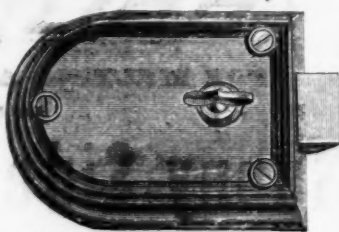
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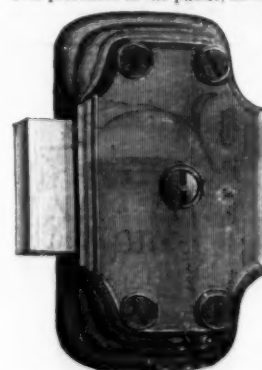
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All of which are furnished with**SMALL, FLAT, AMERICAN STERLING METAL KEYS,**

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A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, they will rival the best made Locks in Finish and perfect operation.

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Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.

THE LOCKS ARE FITTED TO THE KEYS,
And not the Keys to the Locks.

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FULL SIZE OF KEY.

New Patent "X" Razor Strap.

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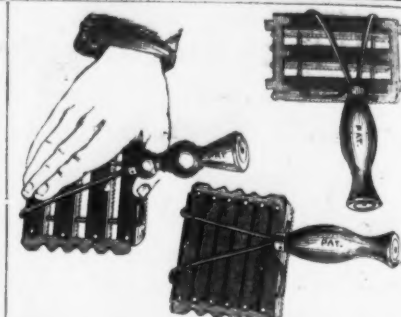
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STEAM VALVES,

Iron and Composition, of all sizes.

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HYDRANTS.

Office and Warehouse, 75 & 77 Kilby St., Boston, Mass.

TURNED MACHINE SCREWS,

One-eighth to five-eighths diameter.

Heads and points to sample.

IRON, STEEL and BRASS.**Lyons & Fellows Mfg. Co.,**

Cor. 1st and North 8d Streets, Williamsburgh, N. Y.

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Fire Brick.

B. KREISCHER & SON,
New York Fire Brick &
STATEN ISLAND
CLAY RETORT WORKS,

Established 1845.

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The largest stock of Fire Brick of all shapes & sizes on hand, and made to order at short notice.

Cupola Brick for McKenize Patent.

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ESTABLISHED 1836.
JOHN R. WATSON, Perth Amboy New Jersey
Manufacturer ofFIRE BRICK,
For Rolling Mills, Blast Furnaces, Foundry
Gas Works, Lime Kilns, Tanneries, Boilers,
and other purposes. Also Fire Clay and Sand constantly
on hand. Shipments made at the shortest notice. Send
for Circular.SALAMANDER WORKS
Of Woodbridge, N. J.

Manufacturers of all shapes and sizes of FIRE BRICK for Furnaces, Rolling Mills, Blast Furnaces, Store Works, Lime Kilns, &c. A full stock of McKenize and other Cupolas. Also Fire Clay and Sand constantly on hand. Shipments made at the shortest notice. Send for Circular.

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Salamander & Albany Fire Brick Works
Bathbone St., bet. Saratoga R. R. and Erie Canal,
Near N. Ferry St., Albany, N. Y.
NEWTON & COMPANY,
(Successors to Palmer, Newton & Co., Manufacturers
of and Wholesale Dealers in Fire Clay, Fire Brick, and
all other shapes. Store, Range and Heater Linings, Portable
Clay Furnaces, Fire Clay, Fire Sand, Mica, Kaolin, &c.)
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CRUCIBLES.
Manufactured by
ADAM NEWKUMET,
1537 & 1539 N. Front St., Phila., Pa.

For Steel, Brass, Nickel, Copper, Bronze, &c.
Equal to any in the market, and all guaranteed.
25¢ per piece a full stock of all sizes on hand, and
being confident of giving entire satisfaction we re-
spectfully ask consumers to give us a trial.

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ESTABLISHED 1846.
HALL & SONS, Buffalo, N. Y.
ESTABLISHED 1866.FIRE BRICK
of reliable quality for all purposes, manufactured of the
best New Jersey Fire Clays. Also, ROCKINGHAM
WARE, YELLOW WARE, Fire Clay, Fire Sand, Kaolin
Ground Fire Brick and Dinosaur Building Brick.PEEKSKILL FIRE BRICK WORKS.
Established 1831.HORTON & MABIE,
Manufacturers ofFire Brick of all kinds,
STOVE AND RANGE LININGS

of every description. Linings for Cupola or
Foundry Furnaces, Blocks, Tiles, McKenize
Cupola Brick, &c.

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Successors to JOHN NEWKUMET, Proprietor
manufactures 9-inch Fire Bricks, Tiles, and Blocks,
for Rolling Mills, Blast Furnaces, Foundries, Ga
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Articles of every description made to order at
short notice, and in a very superior manner.

"CLAY RETORTS FOR SUGAR HOUSES."

Brick Presses,
BRICK PRESSES,
For Fire and Red Brick
PATENT STEAM GEARING

For grinding Clay for Red or Fire Brick, and all
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Oldest and Largest Establishment of the kind in the U. S.

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Little Giant Pipe Machine, Fire and Red Brick
Presses, Clay Wheels, Tile Machines, Stamps,
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for circular.

STAR FIRE BRICK WORKS.

REED & HARBISON,

Manufacturers of Benezet and Clarion Brands of FIRE BRICK.

BENEZET

CLARION

Office and Works, Twenty-Second & Railroad Streets, Pittsburgh, Pa.

Established in 1839.

A. G. COES & CO.

Worcester, Mass.

THE GENUINE

COES' SCREW WRENCHES.

Our goods have been very much improved recently, by making the *Bar Wrench*, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES' NEW PATENT FERRULE

Which cannot be forced back into the "Land."

Our goods are manufactured under patent dated Feb. 2, 1869, (re-issued June 2, 1871), May 2, 1871, and Dec. 28, 1871, and any violation of either will be vigorously prosecuted.

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.

William N. Jennings,
FINE PRINTING AND STATIONERY
No. 43 Franklin Street,
BET. BROADWAY & KIM ST., NEW YORK

Brooklyn Clay Retort and Fire Brick Works,
Van Dyke Street, Brooklyn, N. Y.

Manufacturers of

Clay Retorts, Fire Brick, Tile, &c

STAR FIRE BRICK WORKS.

REED & HARBISON,
Manufacturers of Benezet and Clarion Brands of FIRE BRICK.

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Office and Works, Twenty-Second & Railroad Streets, Pittsburgh, Pa.

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**FOR OPENING
TIN PACKAGES OF
FISH, OYSTERS,
FRUIT,
& VEGETABLES.**



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ROCHESTER, N. Y.

H. R. Seward, Treas.
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**IT SHEARS CLEAN,
LEAVING NO RAGGED EDGES.
EASILY OPERATED,
ALWAYS IN ORDER.**

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Sprague Can Opener Co.,

ROCHESTER, N. Y.

Depot for New York City Delivery, with UNION HARDWARE CO., 123 Chambers, and 50 Warren Street.

COPAL VARNISHES, THE LONDON MFG. CO., HYATT & CO.,

Dazzle Black Baking Stove, Celebrated Brunswick Black Varnish, &c.

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JULIEN CHURN Cotton Waste,



Butter Worker.

Hardware and Agricultural
Implement dealers are offered in
the above an article that is
now a staple in the trade, having
been sold the past eight years
from the Atlantic to the Pacific.
It is correct in principle, and
manufactured in the
most substantial and
handsome manner.

Send for a Descriptive
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PATENT IMPROVED STEAM TRAP.

The only self-regulating Steam Trap in the world.
For full description send for circular to
A. L. JONES,
Steam Heating Establishment, 51 S. 4th Street Phila.

FOR CLEANING MACHINERY,

Cotton Wick, Cotton Packing, Hemp
Packing, Bell Cord, Etc.,

CONSTANTLY ON HAND.

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NO CHIMNEY KEROSENE LAMP
Without Smoke or Smell.
Light equal to gas. Adapted to Dwellings, Churches, Factories or Pub-
lic Buildings. Breakage of one chimney per week will pay for Lamp in one
year. Every Lamp guaranteed for one year. Liberal discounts to trade.
PATENT MECHANICAL LAMP CO., 138 Chambers St., N. Y.

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EASILY AND QUICKLY APPLIED TO THE COMMON FARM WAGON.



SCHENCK & SHERIDAN, Fulton, N. Y.

General Agents for the Erie Torsion Spring Company.

SIMPLE, LIGHT, EFFECTIVE, DURABLE, CHEAP.

All sizes, carrying loads
from one half ton to five tons
as easily as the best Elliptic
Spring. They raise the
wagon body but little. They
are light, weighing but 30 to
60 lbs. A horse can draw 25
per cent. more load with
them. A wagon will wear as
long again with them. Any
person can apply them in a
few moments. They are sold
at prices within the reach of
all. They have been sub-
jected to the severest test in
all kinds of work for the past
five years with entire success.

**10,000 Sets now
in Use.**

They are not liable to be
broken or get out of order.
No more jolting over rough
roads for the want of a Spring.
It utilizes the most perfect
means of elasticity by the
Torsion or twisting of a
straight rod of steel.
They never lose their
Elasticity.
Don't fail to send postal
card for Circulars.

NEW YORK Nickel Plating Co.

Works, 133 & 135 W. 25th Street,
Office, No. 18 Park Place,
ISAAC ADAMS, Jr., Proprietor NEW YORK.

Philadelphia Nickel Plating Works. John Hartman,

No. 149 Ridge Avenue, Philadelphia.
ELECTRO-NICKEL PLATING
On all domestic articles finished in the best manner.
Cable, 615 J. J. Street.



ERIE Lawn Mower

For 1875.

**PERFECTED WITH
ADJUSTABLE CUT.**

Manufactured by
H. M. REED & CO.
Erie, Pa.

Send for Circulars and Price List.

Keystone Saw, Tool, Steel and File Works.

Front and Laurel Streets, Philadelphia.

MANUFACTURERS OF

Barker's Patent Double Reversible Joint Butt Hinges and Concealed Door Springs.

THE BEST IN THE UNIVERSE, ALWAYS RELIABLE.

They never get out of order, and give unbounded satisfaction wherever they are used.

HENRY DISSTON & SONS desire to call the attention of the Hardware Trade; also Architects, Builders, Carpenters, and all parties interested, to the

PATENT REVERSIBLE BUTTS

represented in the annexed engravings.

For the doors of Churches, Schools, Theatres, Banks, Factories, Public Buildings, Hotels, and all places where it is necessary or desirable to swing a door both ways, these Hinges are vastly superior to all others. The neatness of the Butt and the simplicity of its construction make it far more desirable than most of the uncouth and unwieldy hinges now in common use. The concealed spring is the strongest, most durable, and the simplest, consequently the least liable to get out of order.

It is the *neatest*, and being concealed, does not present that unsightly appearance which usually so disfigures doors that have Springs.

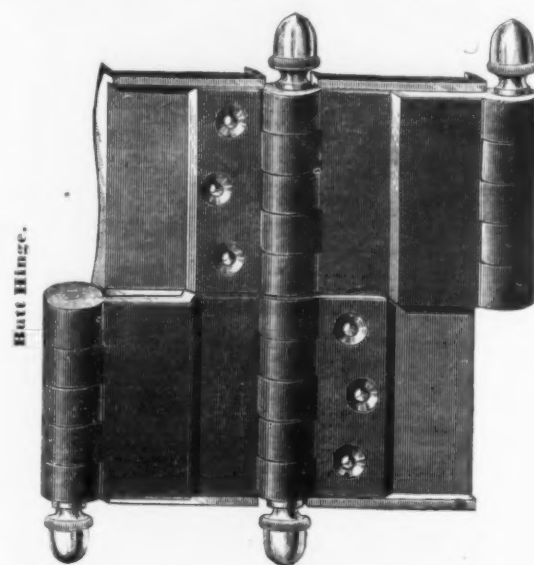
It relieves the Butts of the weight of the door, and consequently adds to the strength.

It prevents the door from sagging.

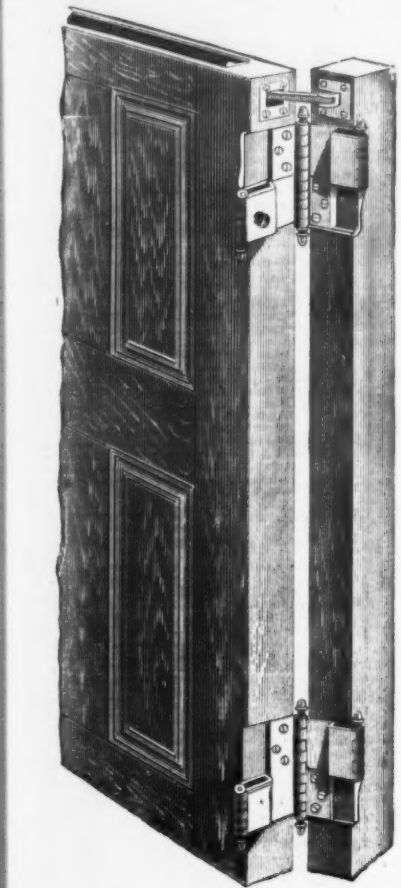
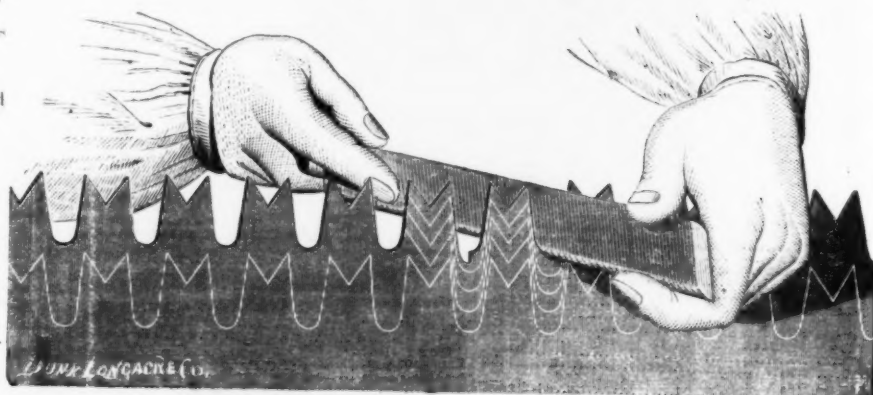
It is more readily applied and easily disengaged, and is altogether the most effective, convenient and elegant Spring that has ever been offered to the public.

Every Spring has been thoroughly tested, is warranted, and will bear twice the strain that is ever applied to a door.

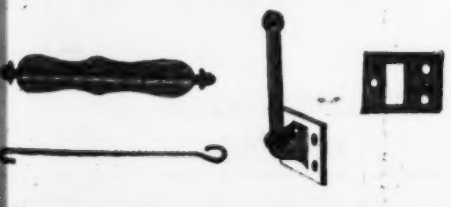
It is by far the cheapest.



Butt Hinge.



View of Door with Hinges and Spring in position.



Concealed Spring.

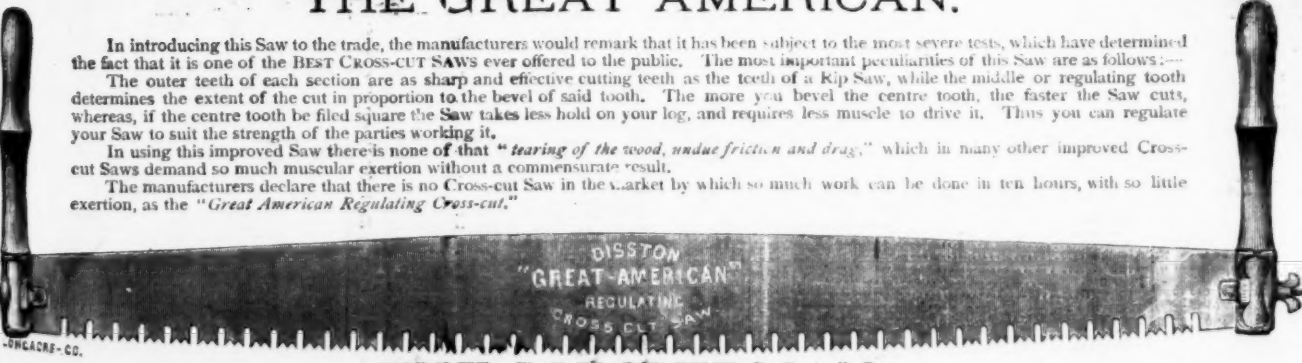
Cross-Cut Saws.

We desire to call special attention to our various styles of Cross-Cut Saws represented in this week's issue.

THE GREAT AMERICAN.

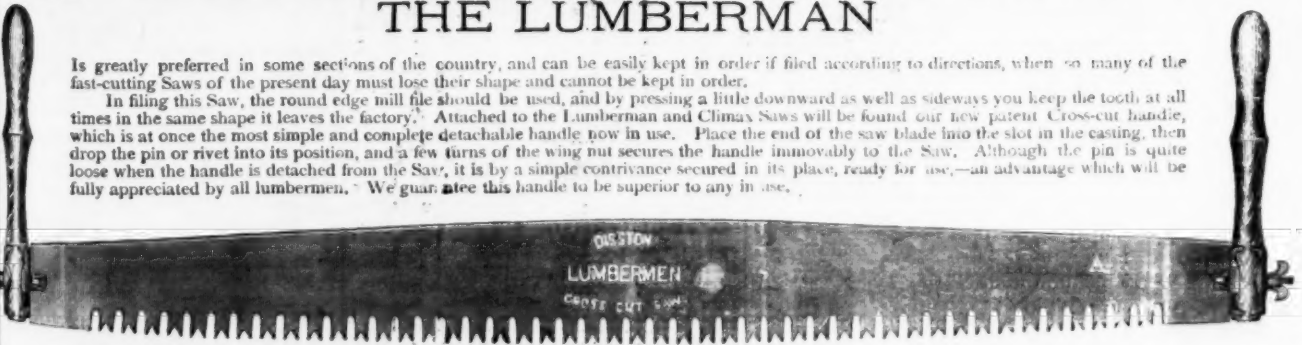
In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the bevel of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.
In using this improved Saw there is none of that "tearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."

The above engraving represents a section of "Lumberman" Cross-Cut Saw, with File specially adapted for keeping said Saw in order. By using the File here illustrated, with the edge made to fit the gullet or space between the Teeth, and pressing downward while filing, you will preserve the old final shape of the Teeth as described by dotted lines and note in engraving. You pay for the edge of the File as well as the flat—then why not use it? and thus keep your Saw always groomed and in order, and avoid the risk of breaking or buckling the Saw by the old method of gumming. This File is manufactured expressly for the purpose of keeping in order the Teeth of our improved Saws known as the "Lumberman" and "Climax," and can be used with equal facility on either Saw. If the File be used according to our instructions, viz.: pressing down in the gullet, at the same time the edge of the Tooth is being filed the effect will be so convincing that persons will never return to the use of the old style File, or any other of the so-called Improved Teeth. We also manufacture a File for keeping the Great American and Climax in order.



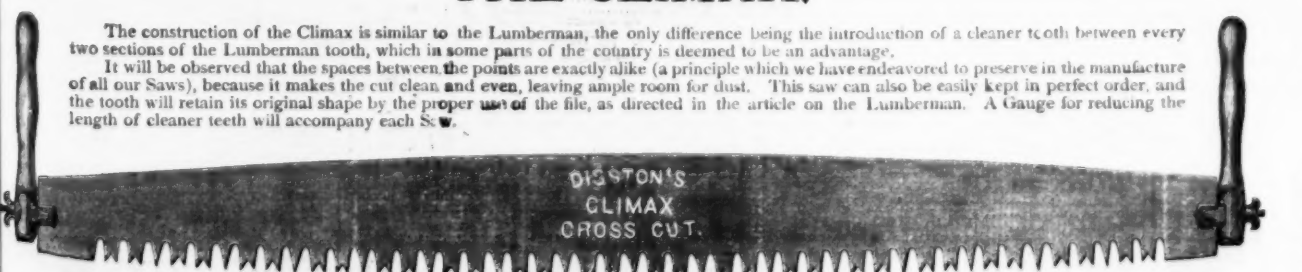
THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use, an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



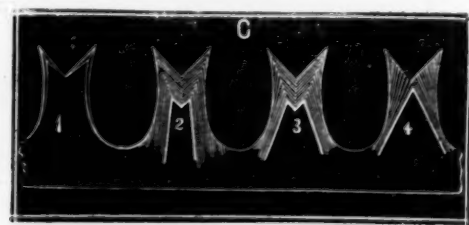
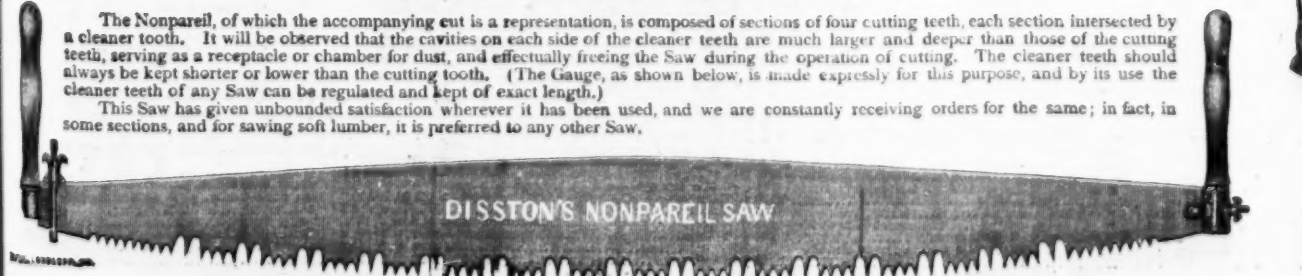
THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.

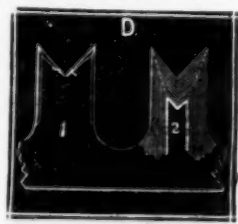


THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



In the manufacture of all our Fast-Cutting Saws, we have carefully avoided the pernicious and destructive practice of making Under-Cut Teeth.
All Saws made on this principle are miserable failures. It is simply applying a Rip Tooth to the purpose of cross cutting, an idea which has been long ago exploded. To get an Under-Cut, the Tooth must be wider at the extreme point than at any other part, and vice versa; filing must result in rapid expansion in the width and ultimate loss of shape, as shown in the annexed diagrams.
No. 1, Fig. C, represents the under-cut tooth as it leaves the factory; Nos. 2, 3, and 4, Fig. C, show how No. 1 must ultimately become under any style of filing that may be adopted. No. 1, Fig. D, shows a tooth with parallel edges, and No. 2, Fig. D, shows the shape of said tooth after several filings. The white lines on the diagrams represent the successive cuts of the file.



GAUGE FOR REGULATING CLEANING TEETH.

The Cleaning-Teeth of all Saws should be somewhat shorter than the Cutting Teeth, and, although shortened, they should be of uniform length throughout. The inner edge of the Gauge rests on the points of the Cutting Teeth, the Cleaning-Teeth projecting through the opening in center of Gauge. Reduce the projecting points by means of a File until arrested by the edges of the Gauge, which is made of hardened steel. Thus Tooth after Tooth can be rapidly and correctly reduced to an even length by any unskilled operator.



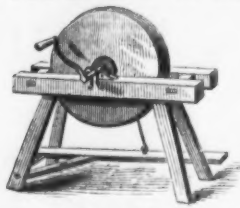
Showing the Gauge in Position for Filing the Cleaner-Teeth.

Henry Disston & Sons.

New York Wholesale Prices, January 13, 1875.

HARDWARE.

[illegible][illegible][illegible][illegible][illegible]

Grindstones, Emery, &c.**Walter R. Wood,
GRINDSTONES.**SOLE AGENT OF THE
BEREA STONE CO., of Ohio.
NOVA SCOTIA and other brands.
283 & 285 Front Street, New York.**Grindstones.****AMHERST,
INDEPENDENCE,
LAKE HURON,
AND BERA.**

Also Scythe Stones.

**WORTHINGTON & SONS, Mfrs.,
North Amherst, Ohio.****EMERY WHEELS AND MACHINERY**

Upon which to run the same, of all kinds.

EMERY  **DIAMOND**
Emery Cloth, Tools,
Mill Stone, Oil Stones,
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Send for Circulars.**Rocky Mountain Vermilion Paint**

A "Nature's Compound" of Copper, Mercury, Lead and Iron. A pure Oxide of Metals, containing no earthy matter, hence we claim, and are prepared to prove that it is the Best and Cheapest Paint in the market. Properly mixed, we will guarantee it to cover double the surface and wear twice as long as ordinary paints. It will not crack, scale, crack or blister, though subjected to high degrees of heat. It will effectively prevent the corrosion of Metals, even in mid-ocean. Warranted superior to red lead or any other lead for any and all purposes for which paint is required. Please send for circulars. All orders should be addressed to W. L. Corey, General Agent, 213 Main St., Providence, R. I.

**Bennett Hotchkiss and
N. C. Stiles' Patent.**This Drop (which has been illustrated in this journal of that class in which the Hammer is raised by a stiff belt or board passing up between two friction rolls, and is so well known that we will only describe our improvements. The patents we are working under are those of Bennett Hotchkiss (who in an interference case with Goulding and Cheney was declared the first inventor) and N. C. STILES. Our improvements consist:
First.—Of an arrangement of parts that makes it the most complete Jobbing Hammer, and will take the place, to a great extent, of all other kinds for forging. In addition to the upright rod, which is operated by the hammer to open and close the rolls, we place another rod the lower end of which is secured to the end of a lever which is operated by the hand or foot, which operation also opens and closes the rolls at will. The lower end of this rod has a slot, so that the action of the hammer will not disturb the hand lever, thereby preventing the hand being injured, as otherwise would be the case.
Second.—No dog is used on the upright to hold up the hammer. The belt or board passes up between two clamps situated under the rolls, so arranged that as the hammer ascends they will freely open of themselves, but as descending they will close and hold up the hammer. To let the hammer fall the clamps are opened by pressure upon the foot treadle.
Third.—The board or belt is secured to the hammer by an elastic connection, which prevents the sudden jar and destruction of the same. The back roll is made adjustable to different thicknesses of board or belt, as also are the clamps. An adjustable collar on the upright rod allows the operator to obtain any height of blow desired automatically. If one blow is wanted, press upon the treadle and remove the pressure as soon as the blow is given. Keep the foot upon the treadle and the blows will be repeated until the pressure is removed. If a blow of less height than the collar is set for is required, work the hand lever, which will give you any height of blow desired. The hammer can be held up at any point below the collar by bringing the hand lever into action when the hammer is at the desired height, so that the next blow can be given from a state of rest, of less height than the collar is set for. This is a feature no other drop has; that is, the first blow struck can be of less height than the second or third, and obtained from a state of rest. A gentle pressure upon the treadle will allow the hammer to go down slowly, but it will stop and remain suspended at any point as soon as the pressure is removed.
The clamps in holding up the hammer keep the board from touching either roll and prevents the same from being worn uneven.Manufactured only by the
Stiles & Parker Press Co.,
MIDDLETOWN, CONN.**L. COES'
Genuine Improved Patent
SCREW WRENCHES.**

Manufactured by

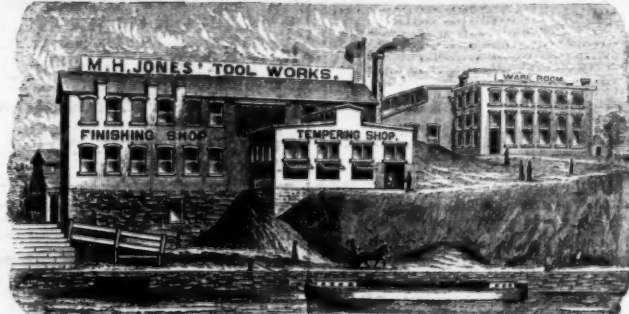
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Worcester, Mass.**Established  in 1859.
Registered March 24, 1871.We invite the particular attention of the trade to our New Straight Bar Wrench, *aided*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged Jaw, made with ribs on the inside, having a full bearing on the front of bar (see section view), making the jaw fully equal to any strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes, which were at once closely imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped**"L. COES & CO."****Warehouse, 97 Chambers St., & 81 Reade Sts., N. Y.
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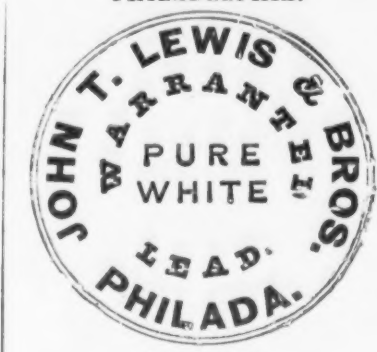
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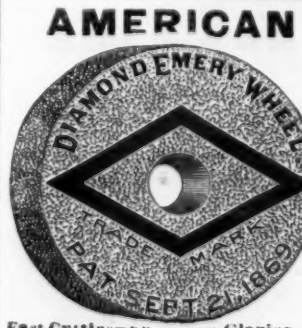
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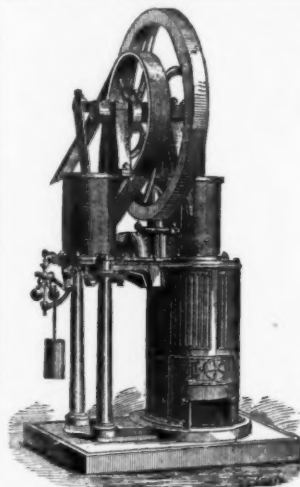
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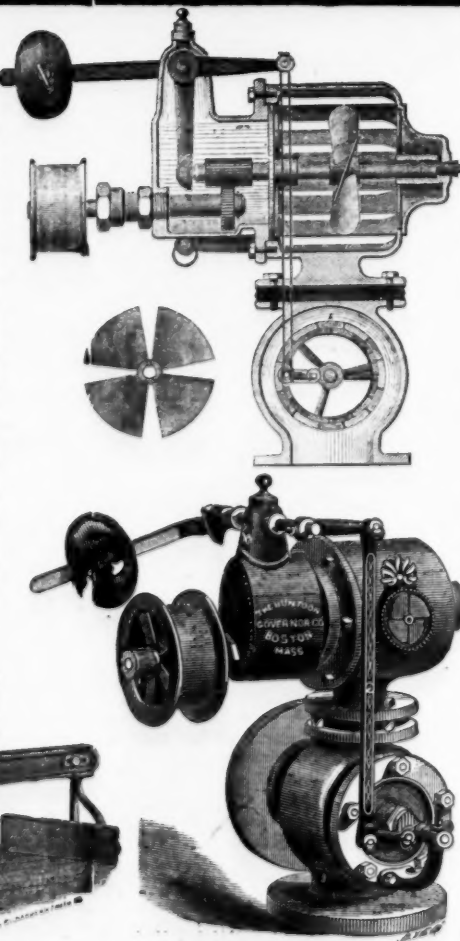
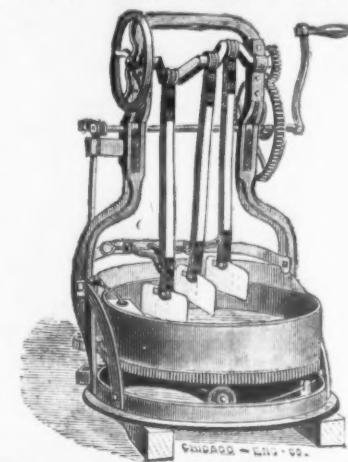
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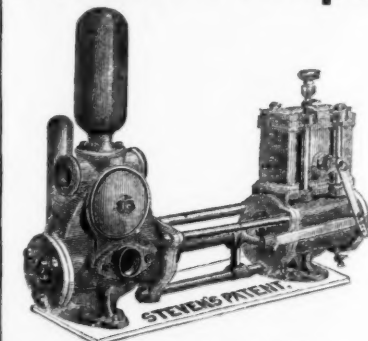
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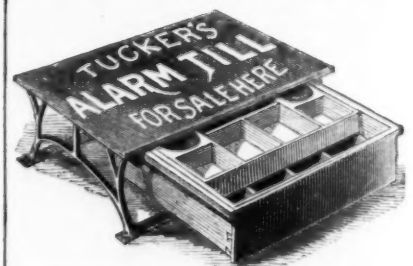
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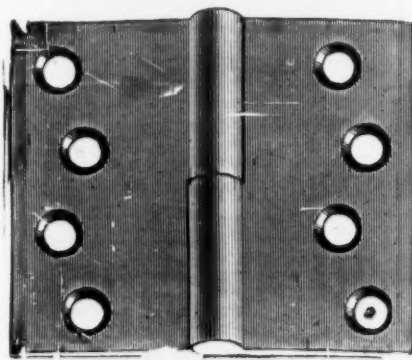
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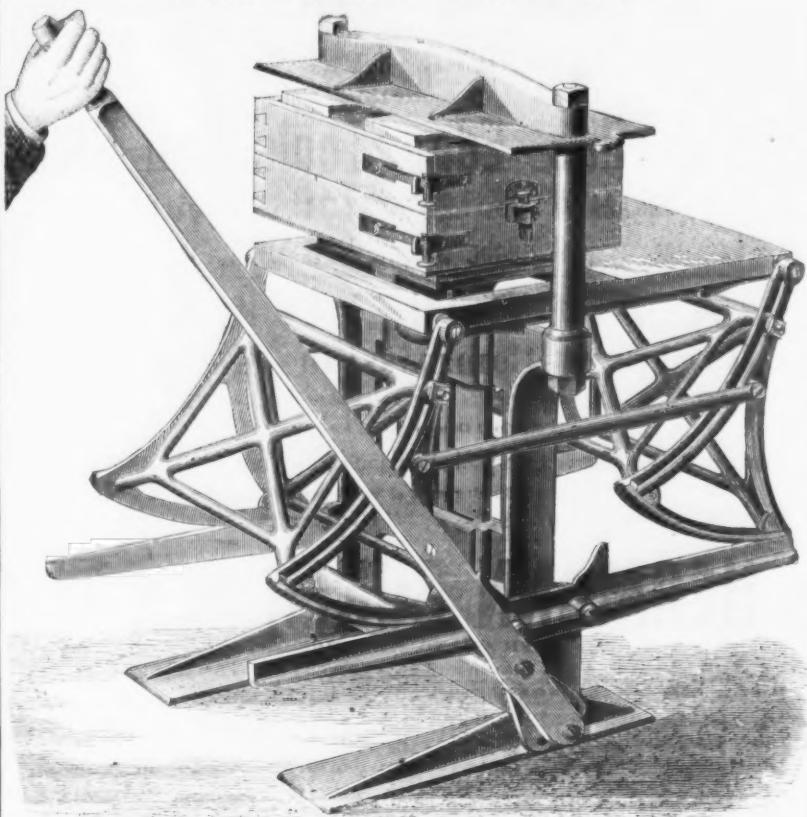
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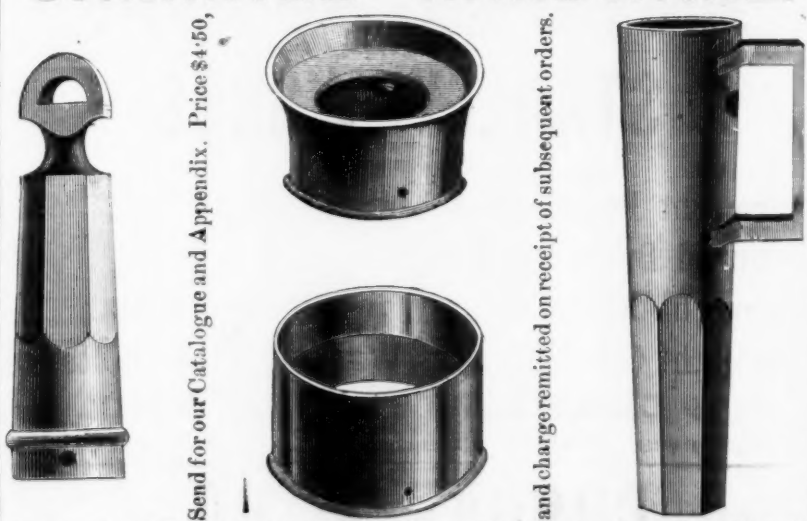
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On the 10th January, 1865, we obtained Letters Patent for improved method of securing necks to Mineral and Porcelain Door Knobs, which improvement was used by us long enough to prove its utility, but on account of unsettled claim of joint ownership by former partner, its use was discontinued. Having now made a further improvement, for which we have made application for a Patent, we are now making the **BEST SECURED and MOST DURABLE** Mineral and Porcelain Door Knobs ever offered in this or other markets.

We solicit orders for these Knobs at our regular prices for old styles, with the understanding that if any can be loosened from or gotten off the necks without breaking the tops, they may be held by the purchaser subject to our order, with expenses added.

See The Iron Age, of August 21st., page 11, for illustrated description of our patent Telescope Locks and Latches, with patent Flat Steel Perforated Keys.

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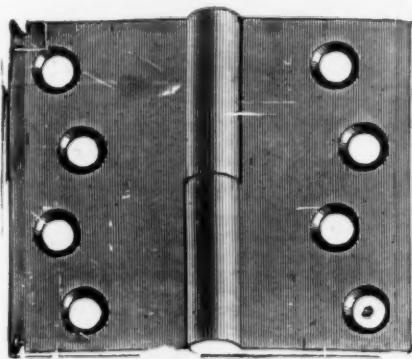
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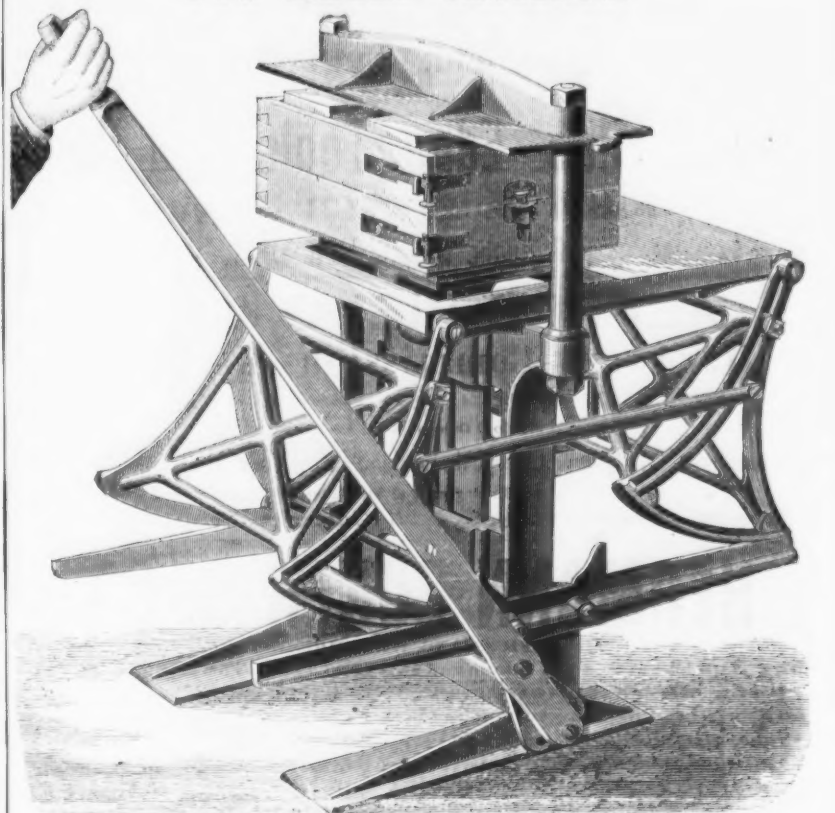
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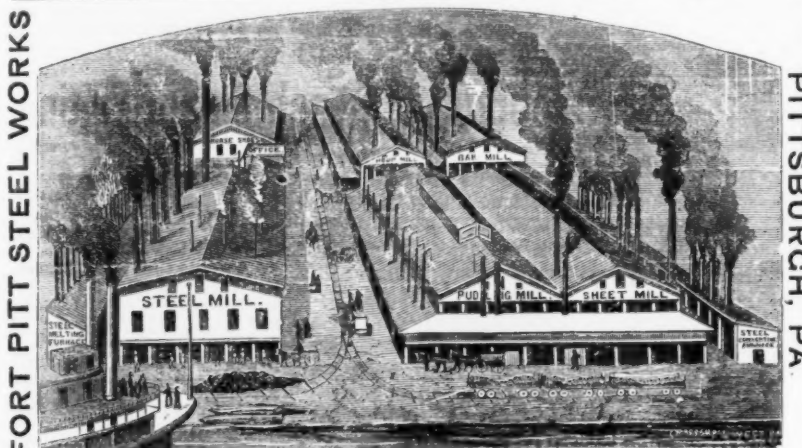
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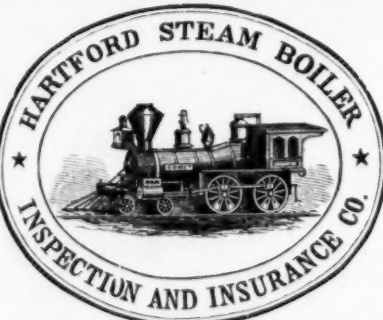
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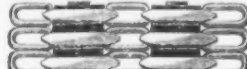
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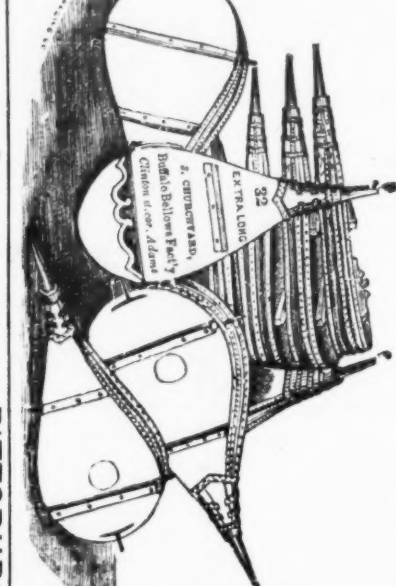
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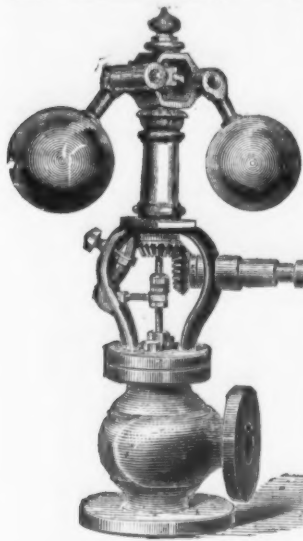
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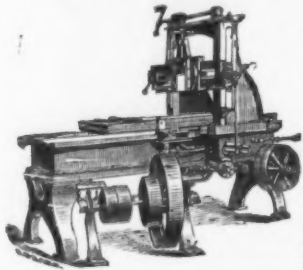
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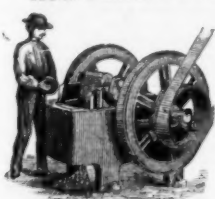
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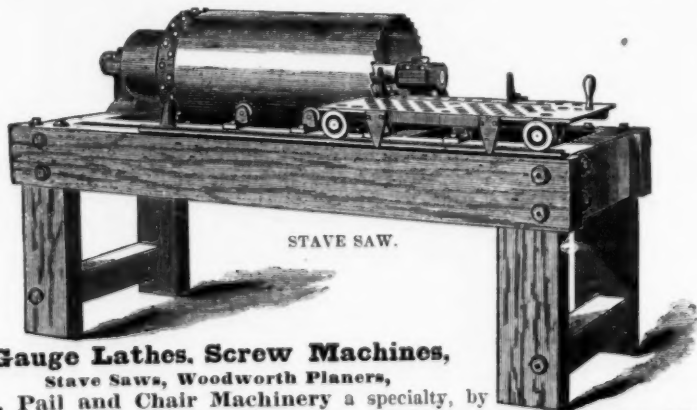


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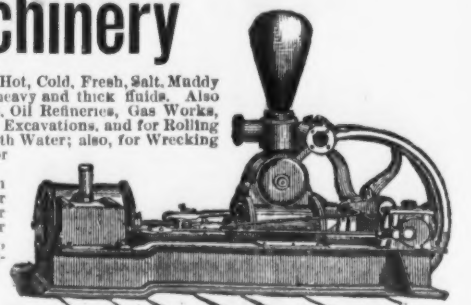
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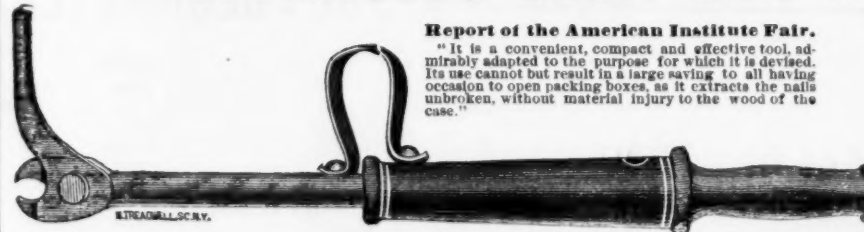
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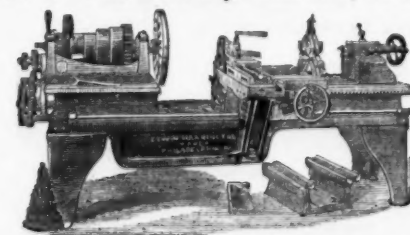
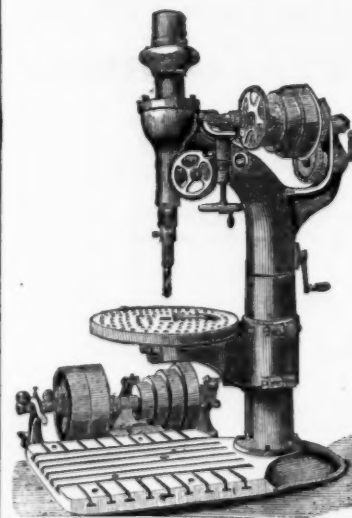
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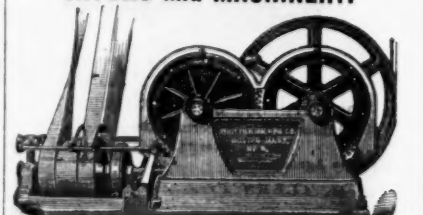


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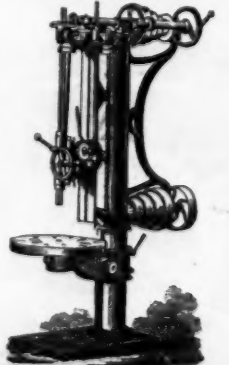
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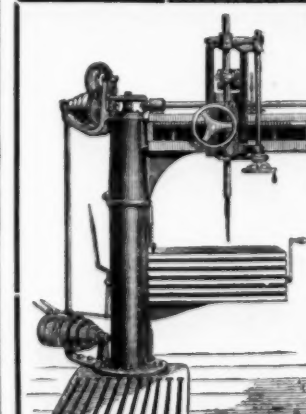
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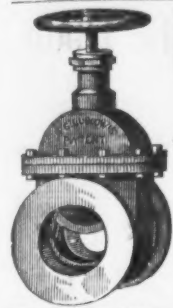
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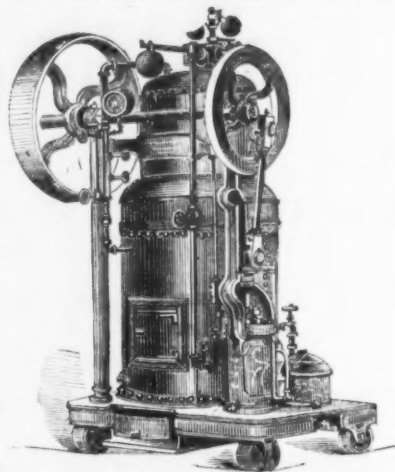
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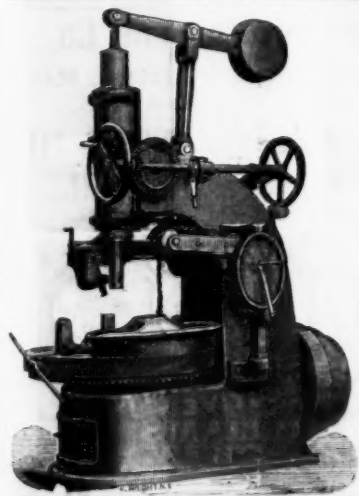
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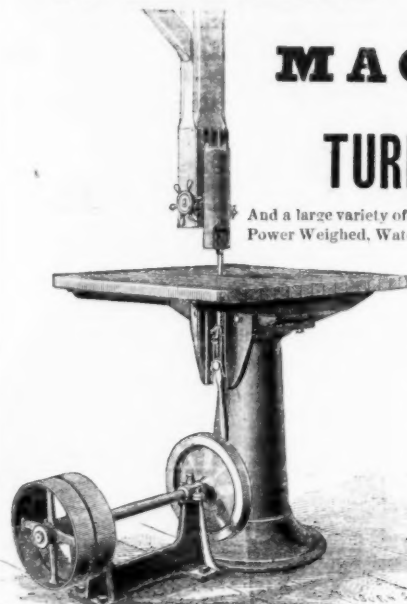
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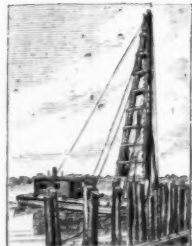
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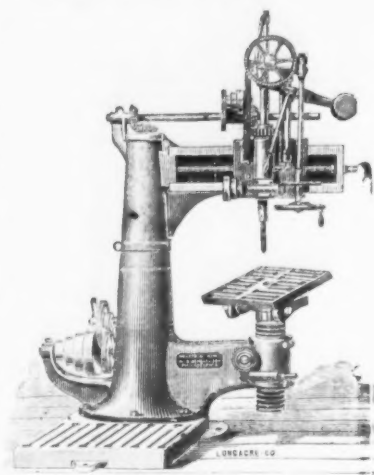
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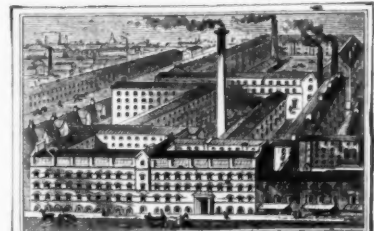
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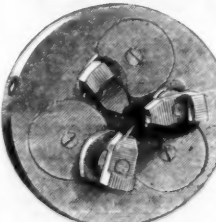
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